MARINE REVIEW.

VOL. IX. CLEVELAND, O., AND CHICAGO, ILL., JAN. 11, 1894. No. 2.

First Twenty-foot Channel Boat.

It is more than probable that the price at which the Globe Iron Works Company of Cleveland has contracted for steel for the new freight steamer to be laid down shortly is the lowest ever secured on ship material in this country. And yet the steel is to be of the best, and Gen. Manager Pankhurst says the boat's scantlings will be the heaviest ever used on the lakes. The low price of material is, of course, due to the great efforts being made by manufacturers to secure business, and is in part due also to what seems to be a determination on the part of the Carnegie company to secure orders at any price. But for the conditions that have brought about low prices the boat would not be built. It can certainly be said that this keel is laid solely for the purpose of keeping a ship yard organization together. On the other hand, however, the boat will be built at a cost lower than anything previously known on the lakes, and if a buyer is not found for her the builders, through connection with the ship-owning firm of M. A. Hanna & Co., can operate her to the best advantage offered in general business.

The steamer will be 304 feet keel, 324 feet over all, 42 feet beam and 28 feet deep, and will be equipped with gangways and machinery for handling flour and other package freight, so as to be adapted to the Buffalo trade as well as the ore business. With increased depth and corresponding strength she is intended to carry a full load drawing 18 or 19 feet of water, and may thus be styled the first 20-foot channel boat, as it is pretty generally admitted that few if any of the boats now in commission can take full advantage of the increased draft of water to be obtained by this big improvement now being made by the government. The inspection will be under the rules of the United States Standard Register. The engines will be triple expansion but details have not as yet been decided upon, as the question of speed is unsettled.

The Globe company will also build for L. P. and J. A. Smith of Cleveland, as soon as plans can be completed, three steel tug hulls, the largest of which will be 80 feet long, 18 feet wide and 12 feet depth. Machinery and boilers now in the tugs Ida Sims, L. P. Smith and one other of the older wooden tugs of the Smith line will be used in these new steel hulls.

Wreck Charts for the Pacific and the Lakes.

If appropriations can be secured, the hydrographic office, navy department, proposes to extend to the Pacific coast and the lakes the work of issuing monthly wreck charts, which has met with great success on the Atlantic. In addition to the regular North Atlantic chart the Washington office of the service sends out this month an advance chart of the North Pacific, which will be published regularly if the recommendation of the secretary of the navy for an appropriation of $10,000 is favorably considered by congress. Of the proposed chart for the lakes, George P. Blount, the officer in charge of the Chicago branch office, No. 1621 Masonic Temple building, says:

"It is the intention of the hydrographer to issue a somewhat similar chart of the great lakes, if the necessary appropriation can be secured. This chart will not contain the meteorological data contained in the other pilot charts, as it is already given by the weather bureau; but only such information of a nautical character as may be useful and interesting to lake sailors, such as curves of equal magnetic variation, wrecks, buoys out of place, changes in lights, use of oil, new shoals discovered, etc., etc. Information or suggestions on this subject will be gratefully received at any time, as it is the earnest wish of the hydrographer to assist all who navigate the lakes. It is believed that such a monthly chart will be appreciated by both business men and lake sailors."

New Charts of the Lakes and Connecting Waterways.

Under appropriations, during the past five years, aggregating $55,000, re-examinations have been made of various localities around the lakes, and importaut changes are being made in a large number of the charts. An appropriation of $25,000, made by the last congress, and which is included in the above total, will result in improvements in some of the charts that will be especially pleasing to vessel masters. Under this appropriation, the men in charge of the work on the St. Mary's river, who are acting under the direction of Gen. Poe, have finished enough field work to enable them to make the drawing for chart No. 3 of the adopted series for new charts of the river, with the exception of the hydrographic work, which it is expected to be able to obtain most economically and accurately by sounding through the ice this winter. In addition, a great deal of work has been accomplished, such as triangulation, astronomical determinations, etc., which will be available for the other charts, and there is now an excellent organization for continuing the work. Outfits, instruments, etc., have been obtained and are in working order. It is understood also, that the first and most important of the new charts—that of Lake Superior on one sheet—is making good progress in the hands of the draftsman, and ought to be available for issue before very long, and the other charts of equal importance, such as Lake Michigan on one sheet and coast charts of Lakes Superior and Huron, ought to follow in due course.

To give the organization in charge of this work its greatest efficiency as an aid to lake commerce, the vessel interests should see that the appropriation of $50,000 recommended by the chief of army engineers is secured at the present session of congress. The work in St. Mary's river so far has shown very clearly the necessity for new surveys, the changes being the natural results of the forty years that have elapsed since the former survey was made. The appropriation should not, however, be confined to work on the St. Mary's river. It should be made in lump and subsequently allotted by the chief of engineers in accordance with the immediate interests of lake commerce.

Stocks of Grain at Lake Ports.

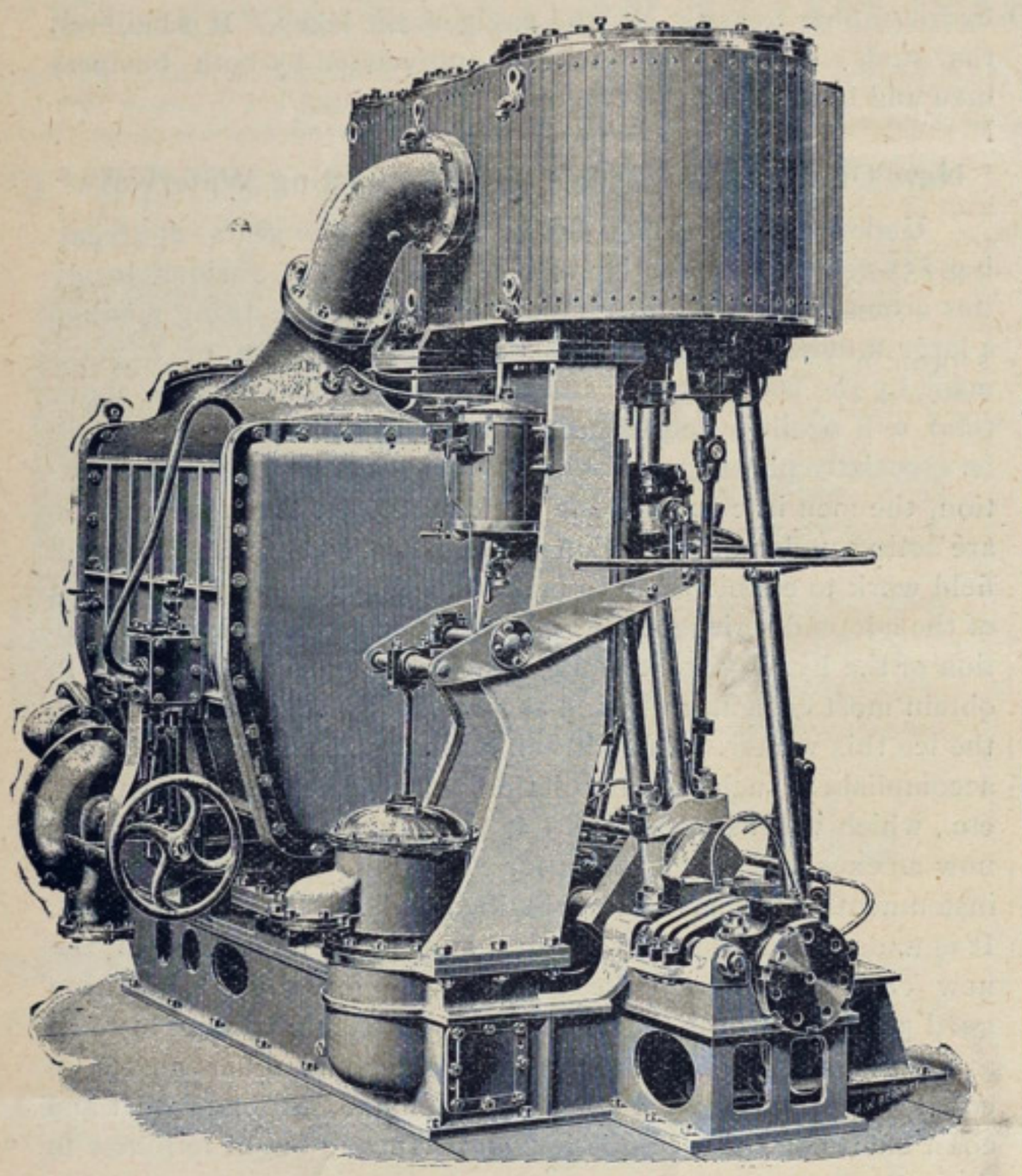
The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Jan. 6, 1894:

	Wheat, bu.	Corn, bu.
Chicago	19,903,000	2,994,000
Duluth	9,369,000	.....
Milwaukee	898,000	.....
Detroit	1,605,000	15,000
Toledo	2,616,000	421,000
Buffalo	2,754,000	711,000
Total	37,205,000	4,141,000

At the points named there is a net increase for the week of 109,000 bushels of wheat and 226,000 bushels of corn.

Engines for a Small Chilian Vessel.

The illustration of triple expansion engines presented herewith is reproduced from Engineering of London. The boat for which they are itended is named Condor, and is a small composite schooner, built at Havre for the Chilian government. Her length is 88 feet 7 inches, breadth 18 feet 8 inches, depth 9 feet 10 inches, and displacement 145 tons. This little vessel presents no special features, but a description of the engines will prove interesting. They are triple expansion, with the three jacketed cylinders placed side by side, and an independent



NOVEL TRIPLE EXPANSION ENGINES.

condenser with brass tubes, tinned inside and out. The circulating pump is driven by a separate motor. The boiler is cylindrical, with two corrugated furnaces and return flues. The shell is of the Siemens-Martin steel, and the furnace plates are of iron. The following figures give some particulars of the engines and boiler:

Diameter of high-pressure cylinder	12.20 in.
" intermediate "	17.72 in.
" low pressure "	26.77 in.
Length of stroke	17.72 in.
Number of revolutions	130
Diameter of boiler	9 ft. 6 in.
Length "	8 ft. 7 in.
Internal diameter of furnace	2 ft. 7½ in.
Area of grate	30.14 sq. ft.
Total heating surface	807 sq. ft.
Authorized working pressure	142 lbs. per sq. in.
Horse power	250
Speed	10½ knots.

Lincoln's Story of the Small Steamboat.

Once during the argument in a lawsuit, in which Abraham Lincoln represented one party, the lawyer on the other side was a good deal of a glib talker, but not reckoned as deeply profound or much of a thinker. He would say anything to a jury that happened to enter his head. Lincoln, in his address to the jury, referring to this, said:

"My friend on the other side is all right, or would be all right, were it not for the peculiarity I am about to chronicle. His habit—of which you have witnessed a very painful specimen in his argument to you in this case—of reckless assertions and statements without grounds, need not be imputed to him as a moral fault, or as telling of a moral blemish. He can't help it. For reasons which, gentlemen of the jury, you and I have not the time to study here, as deplorable as they are surprising, the oratory of the gentleman completely suspends all action of his mind. The moment he begins to talk, his mental operations cease. I never knew of but one thing which compared with my friend in this particular. That was a small steamboat. Back in the days when I performed my part as a keel boatmen, I made the acquaintance of a trifling little steamboat which used to bustle and puff and wheeze about the Sangamon river. It had a five-foot boiler and a seven foot whistle, and every time it whistled it stopped."

Around the Lakes.

The steamer Douglass was sold at Milwaukee, Saturday, by United States Marshal Wiswell for $3,425.

From present indications the annual meeting of the Lake Carriers' Association in Detroit next week will be largely attended.

Edwin W. Carey, marine engineer of Houghton, Mich., died a few days ago in San Antonio, Tex., where he had gone for his health. He was a prominent member of the Houghton division, M. E. B. A.

Manager W. P. Henry of the Lehigh line is temporarily located in the Potter building at Main and Perry streets, Buffalo. President E. P. Wilbur of Buffalo evidently thinks well of Capt. Henry's ability as a manager of steamboats.

It is again reported that the "Soo" line and the American Steel Barge Company have settled their difference regarding the steamers Pillsbury and Washburn, which were to have cost the railway people $200,000 each. It would be interesting to know the basis of settlement.

It is probable that Detroit members of the Lake Carriers' Association will secure new quarters for the annual meeting next week. The rooms of the Shipmasters' Association are comfortable but hardly large enough to accommodate the large gathering that will be attracted by the importance of subjects to be discussed at this meeting.

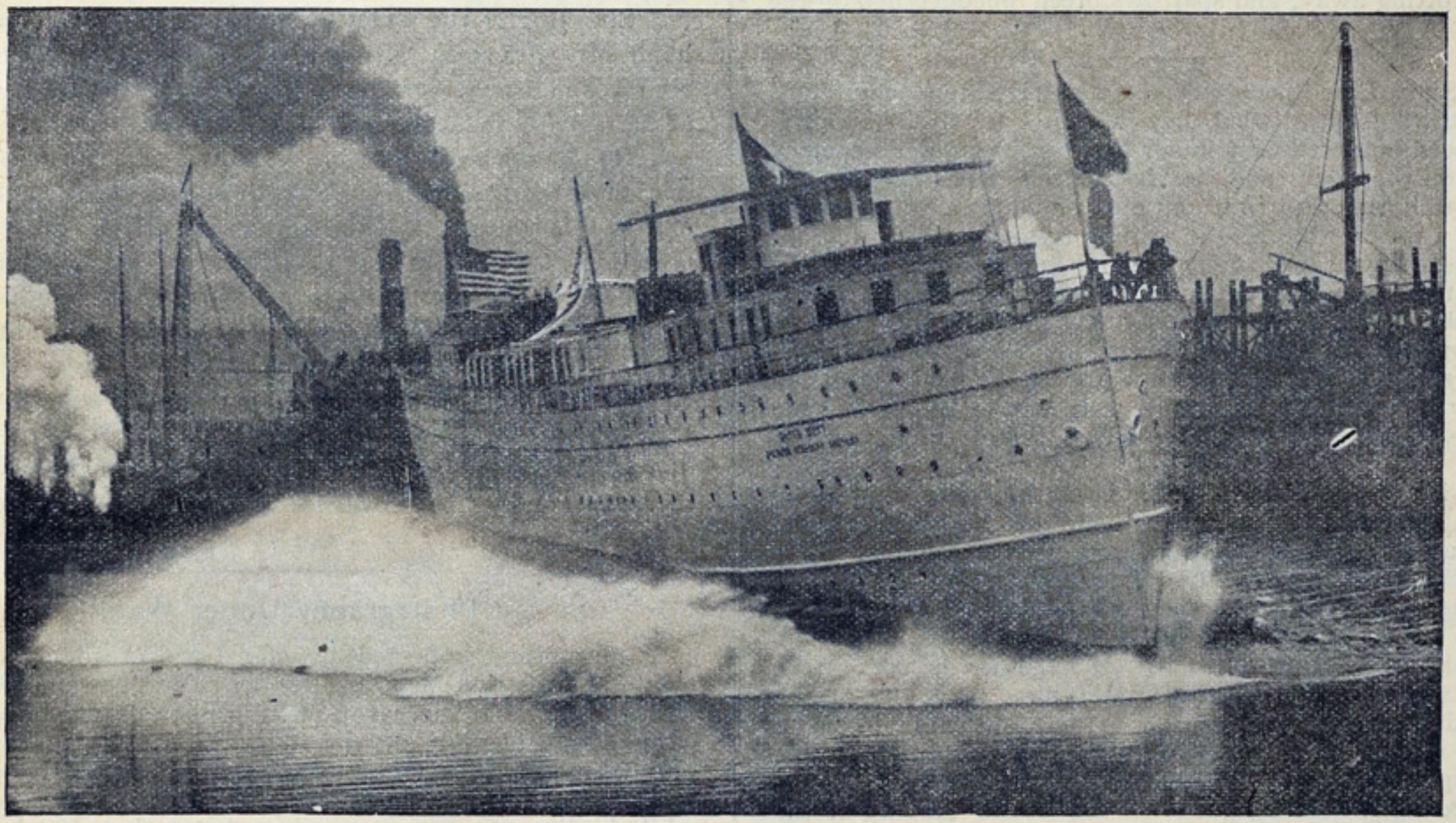
Launch of the First of the Northern Line Ships.

Since the keel of the first of the two twin-screw passenger ships for the Northern Steamship Company was laid, Oct. 7, 1892, readers of the REVIEW have been well informed as to the progress of work, and full details of the advance practice adopted in engines, boilers, cabin arrangements, lighting apparatus, etc., have been given as soon as the plans of owners and builders would permit. All engravings of the ships and machinery that have so far appeared have been reproduced from originals prepared for the REVIEW. Every effort has been made, then, to give to these vessels in illustrations and descriptive matter the recognition due them as the greatest merchant ships designed in this country previous to the letting of contracts with the Cramps, a few months ago, for the new American line boats that are to run between New York and Southampton.

The display, Saturday, attending the launch of the first of these two boats, the North West, is however, worthy of extended notice, as the occasion was marked by far more enthusiasm than was expected by the builders or owners, who had planned no special ceremony. Nearly all of the ship yards on the lakes were represented by leading men connected with their management, and the number of people who witnessed the launch has been vari-

ously estimated from seven to fifteen thousand. There was never before such an outpouring of people at a lake launch, and it would be a very difficult matter to ever again bring together such a representative gathering of men engaged in the shipping and ship building business. Prominent among the visitors were the following: Frank E. and F. A. Kirby of the Detroit Dry Dock Company; W. A. Livingstone of Detroit; W. L. Brown, president of the Chicago Ship Building Company; John Craig and son, Craig Ship Building Company, Toledo; Edward Gaskin of the Union Dry Dock Company, Buffalo; Robert and James Wallace and Wm. Fitch of the Cleveland Ship Building Company; A. W. Goodrich, president, and Capt. J. W. Gilman, superintendent of the Goodrich Transportation Company, Chicago; G. Hurson, general traffic manager of the same company, Milwaukee; J. C. Parker of the Detroit Dry Dock Company; Frank E. Fisher and H. H. Meady of the Fisher Electric Company, Detroit, manufacturers of the steamers' electric machinery and appliances; Sinclair Stewart, surveyor for the United States Standard Register, under the rules of which the vessel is classed A1* for twenty-five years; Capt. M. M. Drake of the Lackawanna company, Buffalo; G. S. Whitslar of the Graham & Morton Line, Chicago; J. H. Channon of the H. Channon Company, Chicago; C. H. Westcott, supervising inspector of steam vessels, Detroit; J. J. O'Connor of Macdonell & O'Connor, Fort William, Ont.; A. Crossman of Chicago, furnisher and decorator for the ships; C. L. Daniel, agent of the Erie Railway Company, J. S. Murray, agent of the Empire Line, W. S. Nevins, agent of the Lehigh Valley Railway, George E. Latimer of Grattan & Latimer, railway contractors, Capt. Martin Niland and W. J. Connors, all of Buffalo; A. T. Stafford, agent of the Pillsbury-Washburn flour mills, St. Paul: Mr. Mather of Philadelphia, representing foreign underwriters; H. K. Taylor, John I. Williams and J. F. Taylor of Youngstown; Joseph Boland of Galvin, Clark & Boland, Buffalo; Homer J. Carr of the Lake Marine News Association, Chicago; L. A. Lenchman of the Buffalo Courier, B. R. Newton of the Buffalo News and Mr. Daniels of the Buffalo Express; Miers Coryell of New York, engineer, engaged in the construction of the vessel's boilers and machinery; T. P. Carpenter of Buffalo passenger agent of the Northern Steamship Company; Stewart Murray, W. J. Stewart and R. S. Hair, all connected with the steamship company, and John Gordon, general manager, and F. P. Gordon, assistant to the general manager. Nearly all of the leading vessel owners and shippers of Cleveland, as well as the various officers of the Globe company were also among the distinguished people gathered around the launching stands.

No banquet or special display of any kind that might be construed as an advertising feature was contemplated. The launch was simple. Two stands or platforms, one just forward of the bow and the other some distance from the shore side of the vessel about amidships, were arranged for the ladies who were honored by being given a part in the ceremony. Electric bells at the ends of the ship were connected with the center stand, where Miss Hanna, daughter of President Hanna of the Globe company, who was attended by Gen. Mngr. John F. Parkhurst, pressed a button when all was ready to cut the ropes. An instant later Mrs. F. P. Gordon, who was attended by Secretary Allen in the forward stand, broke a handsomely decorated bottle of wine over the bow as the immense hull, weighing about 2,100 tons, slid down the ways 60 feet and dropped 5 feet to the surface of the water. The launch was highly successful, and the principals among owners and builders were relieved of anxious feelings, due mainly to the fact that the boat, which had just been floated, was in many respects, far different and superior to any that had preceeded her from the same yard.



LAUNCH OF THE TWIN-SCREW STEEL PASSENGER STEAMER NORTH WEST.

In the way of a brief description of this ship, it may be said that she is of mild steel throughout. Her dimensions are: 383 feet over all; 360 feet between perpendiculars; 44 feet moulded breadth; 26 feet moulded depth, and 34 feet 5 inches depth to spar deck. The engines are of the vertical quadruple type, to be worked in connection with twenty-eight water tube boilers of Belleville type, which are to be divided into three groups—two of ten and one of eight generators. The nominal evaporative efficiency of the boilers will give to the main engines 7,000 horse power and to the auxiliaries 500 horse power more, with natural draft. The size of cylinders are 25 inches high pressure, 36 and 51½ inches intermediate, and 74 inches low pressure, with a stroke of 42 inches.

In the following issues of the REVIEW extended descriptions of different parts of these vessels, with illustrations, will be found: Vol. VI, Nos. 24 and 26; Vol. VII, Nos. 14 and 19; Vol. VIII, Nos. 5 and 25.

Tips From the Man on the Dock.

From time immemorial the navigator has shrugged his shoulders and frowned when told to go to Sandusky for a cargo. "What! Are times so hard," he would ask, "are there no loads elsewhere?" Yet he goes and growls and comes away with a small cargo to insure free passage out into Lake Erie again. The dredged channel after Sept. 15 is not reliable for over 14 feet draft, but with a northeast wind a few of the lucky ones have succeeded, a month earlier, in getting out with 15 feet, and in all such cases the fact was immediately advertised. The government lights are good for aiding side-wheel steamboats, scows and fish boats, or any light craft, but after dark there is probably no one in existence who can with all the aids guess his way around Cedar point drawing 14 feet of water. The new cut leading to the B. & O. docks from Cedar Point will be a blessing as far as it goes, but the inhabitants of the place are undisturbed about their dock facilities along the city front. Nothing disturbs the the quiet of Sandusky. Its unmolested immunity gives it a sort of a careless air. If no fish are caught this year, they hope to catch some next year. Greater facilities for shipping concern none of the limestone rock blasting, grape growing, wine making people of Sandusky. The supremacy of one decade over another does not entitle it to any recognition as far as dock and harbor improvements are concerned. The elevators of the B. & O. have been the home of the owl and the bat; the little old docks are rotting away, and sparrows breed unconcerned on the premises.

The "Short Line" people by the way have been loading coal at a down town dock, in what they call quick time. They have, however, been bothered very much by loading under cramped conditions on the dock; and besides, vessels are forced to load the after hatch first, and pull out one hatch at a time to avoid landing on a rock with 9 feet of water on it somewhere forward of midships. If you load too deep, your keel is in the mud, and if you don't get enough in aft to finish after the forefoot clears the rock, there is no getting ahead to get fuel or freight aft, so look out for this latter day improvement. These "Short Line" people have a dock over a mile farther west where they intend to load any boat in a day. Hoping such will be the case in the near future, let us try to get there early in the morning.

There is a cut or dredged ditch along the city front about 300 feet outside of the docks, which is said to be 50 feet wide. There are no marks or stakes to indicate its whereabouts. It is known to the tug men generally. They find it with a pole, and after grounding on both sides they succeed in getting a boat pulled into it from any place if she is not too deep. This obscured ditch in this beautiful prairie of shallows is one of the sources of wealth to the tugging fraternity. It is one of the secrets of the order, and any marks or improvements to aid an outsider in finding it would seriously disturb the security of the membership. On arriving at Sandusky, the beginning of wisdom is to contract with a tug to do the entire moving of the boat. Make the price as low as it is possible to get it, with the understanding that if you are grounded the tug forfeits the entire bill, and that you are to confer with the tug man in regard to loaded draft and load no deeper. Then it is safe to say you are safe; otherwise you are unsafe.

This pleasant, cheerful appearing city has been the home of some financiering, scholarly men. Its surroundings have captivated and enticed the sportsman, the hunter, and the weary, tired man of business. Its adjacent islands once excited the cupidity of our once common foe, and finally became the roosting place of a lot of the particular friends of Jeff Davis in the sixties. But the notoriety of this now silent, somber city, is all in the past. Through its deliverance-end of that famous underground tunnel the black man made his escape from the land of the free to Malden, where he was freer, and looked back and blessed Sandusky. With its spires and schools and clean appearance the town ought to be religious, wise and healthy. But beyond its catching, freezing and selling fish, beyond the sales of a limited number of cases of cheap wine, and the drinking of much of the same quality, it has no hustle in it. No recognized whistle gives the working hour blast, the stillness of the noon hour pervades the entire twenty-four, the blinds are closed on its windows till late in the day, and its doors creak on their hinges. When the nation begins to turn off its back and draws up its knees preparatory to getting on its feet, let us look for a move in Sandusky.

Interested Spectators at the Launch.

Not far from each other in the great throng of people that surrounded the steamer North West, just before she slid into the water in Cleveland Saturday, were Miers Coryell of New York and A. U. Sheldon and Walter G. Miller of the Globe company, Cleveland. Unnoticed excepting by visitors well informed in ship building matters, these gentlemen might have been taken for spectators having only a curious interest in the costly mass of steel that was about to be floated. Their manner would indicate little more. And yet they were the three men who were responsible for all of the active, working detail entering into a ship costing more than half a million. Mr. Sheldon, naval architect, has been with the Globe company since the Virginia was built. His principal experience was gained with the Thompsons on the Clyde. Mr. Coryell was a member of the naval advisory board, organized at the time of the building of the first ships of the new navy. He is an engineer of prominence in New York, and as the American representative of the Belleville boilers, and also the representative of the owners of the boats, he has been associated with Constructing Engineer Miller of the Globe company in the building of the engines and boilers.

Speaking of the undertaking which these engineers have in hand, Mr. Frank E. Kirby of the Detroit Dry Dock Company, who was in attendance at the launch, said that he was not at all of the opinion that they were going too far in advance of present progress in work of the kind. He had made a thorough examination of the Belleville boiler with a view to taking the agency of it in this country, and the high range of first cost was the only objection to it. But at the time of his examination the adoption of the boiler in these steamers, which would have been an important item against the matter of cost, was unthought of. Mr. Kirby is somewhat doubtful about the advisability, from a commercial standpoint, of constructing such superb and costly ships for lake passenger service, but his desire is that he may be of a wrong opinion, and that the projectors of the new line may be repaid many times over for the bold and progressive move they have made.

Photography Under Water.

Information collected by the Paris Academy of Science would indicate that M. Louis Boutan, a French scientist, has met with considerable success in making photographs of objects existing at considerable depths under water. He has proved that photographs can be taken in a brief time under water, in calm weather, by direct sunlight, at depths up to six or seven meters; while by the use of a magnesium lamp, they can be taken instantaneously, at any depths that can be conveniently reached by a diver, and the state of the weather is of no importance.

In General.

Germany has decided that cinnamon yellow is the best color for war ships.

A new steam hammer, said to be the largest in the world, recently put up in the Krupp gun foundry at Essen, is so delicately adjusted that it could be made to beat out a hair spring.

The British steamer Turret, now in New York harbor, has been chartered to return the Krupp world's fair exhibit to Hamburg, and the shipment will be made from the Maryland Steel Company's works, below Baltimore.

The Old Dominion Steamship Company's new steamer Jamestown was launched a few days ago at Roach's shipyard, Chester, Pa. The vessel has a length of 300 feet, a length over all of 342 feet, a beam of 40 feet, and 26 feet 9 inches depth of hold. She will be schooner rigged, with two masts. The engine will be of the triple expansion, condensing type, with cylinders of 28, 44½ and 73 inches for the high, intermediate, and low pressure, and a stroke of 54 inches. The propeller is manganese bronze, and the vessel is expected to develop a speed of 15½ knots an hour. The boat will have accommodations for 100 first class passengers.

Illustrated Patent Record.

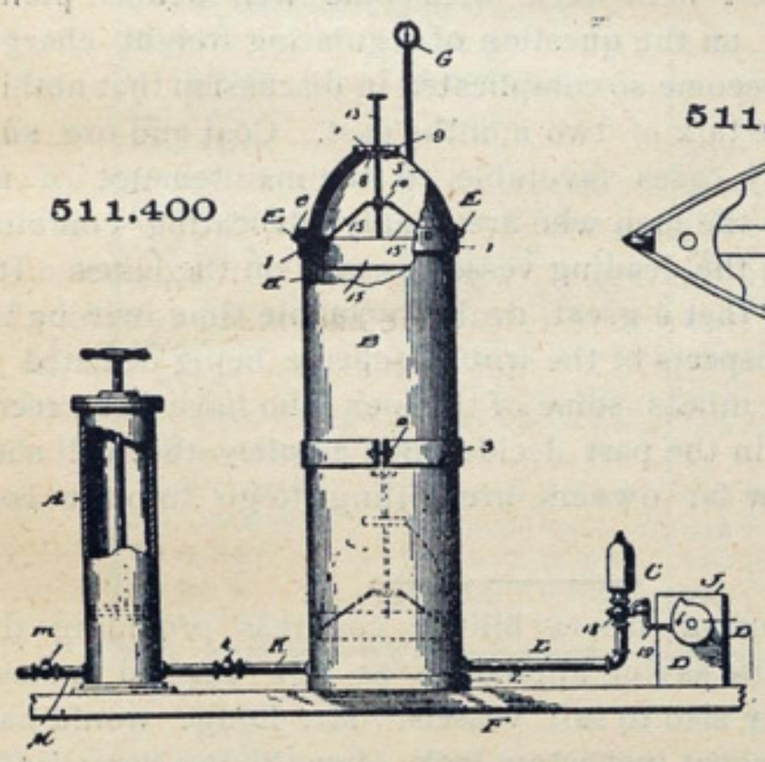
511,400. FOG SIGNALLING APPARATUS. Abner R. Bostwick and John Duffy, Detroit, Mich. Filed July 26, 1893. Serial No. 481,530. (No model.)

Claim: First, a signalling apparatus comprising a tank to contain compressed air and provided with a movable cap constituting a plunger, a signal device to be operated by the compressed air, a valve therefor and mechanism in operative connection with said valve to automatically open the valve at predetermined intervals to release a part of the compressed air to sound the warning. Second, in a signalling apparatus, the combination with a tank to contain the compressed air having an open end and having the signal device connected therewith, of a movable cap constituting a plunger movable in said tank to close the open end, and means for expanding the lower end of said plunger to obtain a tight joint, substantially as shown and described.

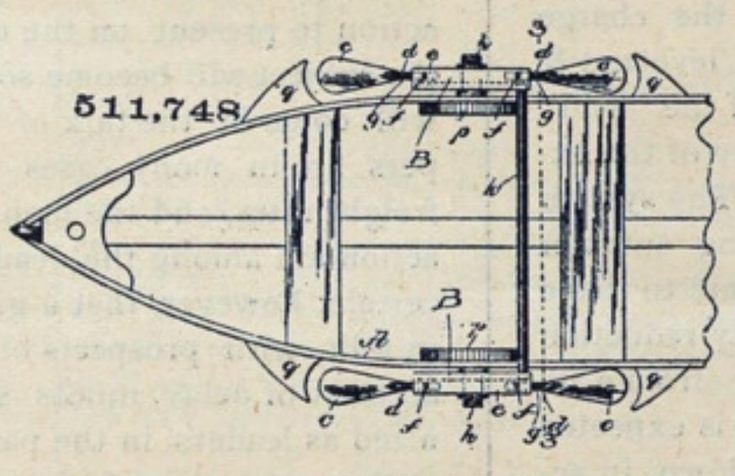
511,748. BOAT-PROPELLING DEVICE. James F. Bliss, Boston, Mass. Filed Dec. 28, 1892. Serial No. 456.596. (No model.)

Claim: First, the combination with a pair of rotary paddles, of the actuating cross-bar *k* between them, the ends of the said cross-bar being engaged with the said paddles with capacity to slide along the latter from one side to the other of the pivots of the paddles, substantially as described. Second, a boat propelling device embracing two rotary paddles, one for each side of the boat, each of said paddles consisting of a grooved body portion provided with adjustable blades and means for rotating said paddles, consisting of a cross-bar engaging the grooved portion.

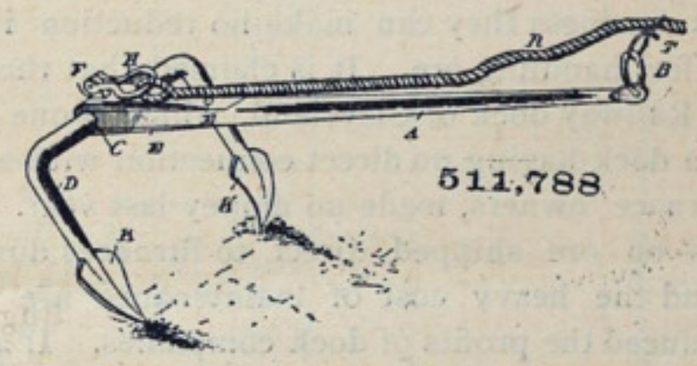
511,400



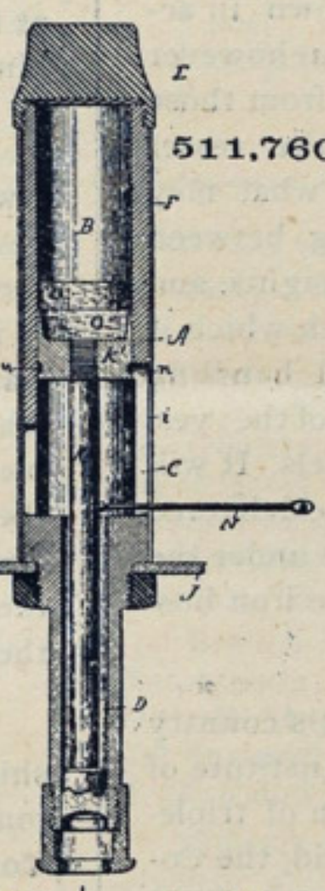
511,748



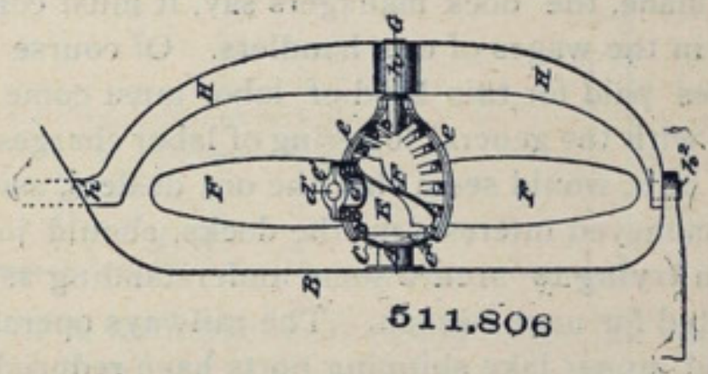
511,788



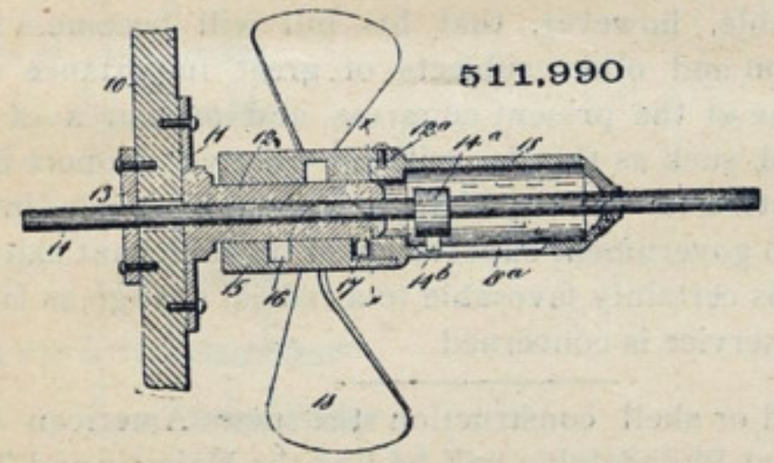
511,760



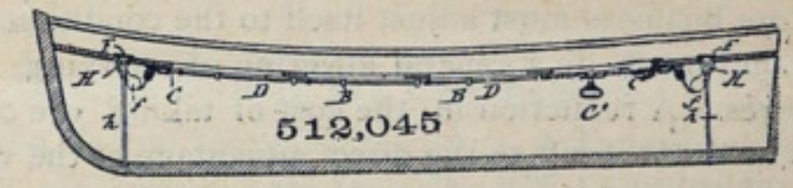
511,806



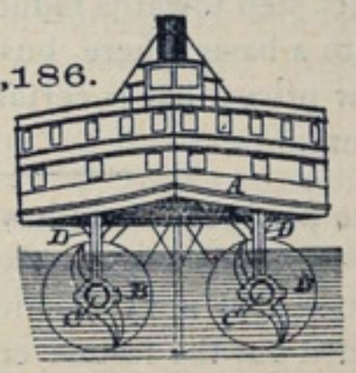
511,990



512,045



512,186.



511,760. STEAM-ENGINE INDICATOR, William M. Dodd, Dayton, Ohio. Filed June 22, 1893. Serial No. 478,423. (No model.)

Claim: In a steam pressure indicator, the combination of a cylinder, having the air chamber B; the piston rod, the head of which is adapted to move in said chamber; the pencil arm attached to said piston; the rotating drum; and means of preventing the entry of air to, or the escapement of air from the chamber B, whereby an air cushion is formed to exert pressure against the piston head.

511,788. ANCHOR. Duncan McDonald, North River, North Cape, Canada. Filed Feb. 27, 1893. Se ial No. 463,871. (No model.)

Claim: In an anchor, the combination with the shank, of a bow or yoke having parallel arms arranged in the same plane, said yoke being pivotally attached to said shank so that both arms may lie upon either side of the shank- and flukes carried by and integral with the extremeties of said arms and turned or bent, respectively, in opposite directions from the plane of the bow or yoke, whereby one fluke is turned down, or toward the surface upon which the anchor rests, in either position of the latter, substantially as specified.

511,806. STEERING PROPELLER, Samuel Seabury Bayonne, N. J., assignor of one-half to Henry Schuyler Ross, U. S. Navy. Filed Feb. 27, 1893. Se ial No. 463,807. (No model.)

Claim: The combination with the drive shaft having a globular bearing fixed thereon, of a sectional propeller wheel having a hollow hub for embracing the globular bearing and having a bearing contact therewith, and a connecting piece having a rocking engagement with the globular bearing, the hollow hub having a rocking engagement with the connecting piece.

511,990. PROPELLING APPARATUS, Benny Bernstein, New York, N. Y. Filed Feb. 16, 1893. Serial No. 462,603. (No model.)

Claim: In a propelling apparatus, the combination, with a bearing sleeve attached to a fixed support, and a guide swiveled to said bearing sleeve and formed with a semi-circular member, of a hub rotatable and reciprocable on said bearing sleeve and carrying blade or fans, and formed with an internal figure-8 shaped cam groove receiving the guide carried by the bearing sleeve, a cylindrical cap attached to said hub, axially apertured at its free end and formed internally with a longitudinal recess, and a driving shaft journaled in the fixed support, bearing sleeve and cylindrical cap and said shaft carrying a pin entering the groove in said cap and having play therein.

512,045. ENGAGING AND DISENGAGING GEAR FOR BOATS. William Mills, Sunderland, England. Filed June 27, 1893. Serial No. 478,955. (No model.) Patented in England Mar. 30, 1892. No. 6,141.

Claim: A disengaging or engaging gear for raising or lowering boats, the same comprising pivoted counter weighted tripping hooks and means for supporting them at each end of a boat, chains connected with the hooks, pulleys over which the chains pass, two of the pulleys being in juxtaposition, metallic rods with the outer ends of which said chains are connected, guide-eyes through which said rods pass, the same being arranged along the inner side of the gunwale of the boat, and a pendant handle connected with the chain which passes over said juxtaposed pulleys and being arranged between them, said handle being operated by a direct pull toward the center line of the boat.

512,186. BUOYANT SCREW PROPELLER. Augustus W. Getchell, Cleveland, Ohio, assignor of one-half to Joseph G. Chadwick, same place. Filed June 12, 1893. Serial No. 477,384. (No model.)

Claim: A combination of buoyant screw propellers, consisting of hollow open shafts CC, spiral buoyant blades BB, mounted on said hollow shafts, boat body A, hangers D D, suspended from said boat and carrying the said shafts and buoyant screw blades, and means for giving rotary motion to said propellers all constructed to operate substantially as described.

The steamboat inspectors at Milwaukee have suspended for sixty days the licenses of officers involved in the Orr–Smith collision case, but this action is of very little importance. The sixty days will expire previous to the opening of navigation next season, and even were the licenses revoked the power of inspectors would be limited to the balance of time that they cover, which is in all cases only a portion of a year, as they are issued annually. It will thus be seen that the revoking or suspension of licenses is in many respects a farce.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O. Chicago office, (branch), No. 726 Phoenix building.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1892.	1891.	1890.	1892.	1891.	1890.
No. vessel passages	12,580	10,191	10,557	3,559	4,207	3,389
Ton'ge, net regist'd	10,647,203	8,400,685	8,454,435	7,712,028	8,698,777	6,890,014
Days of navigation..	223	225	228	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

MANAGERS of the iron ore docks say that on the basis of last year's business they can make no reduction in the charge to vessels for handling ore. It is claimed that the Cleveland & Pittsburg Railway dock of Cleveland, which is one of the "wild" docks, or a dock having no direct connection with any of the extensive furnace owners, made no money last vear. The system of rebates on ore shipped direct to furnaces during summer months and the heavy cost of maintenance are said to have greatly reduced the profits of dock companies. If any reduction is to be made, the dock managers say, it must come from a reduction in the wages of ore handlers. Of course it is expected that prices paid for this kind of labor must come down in accordance with the general lowering of labor charges, but however this may be it would seem that the ore dealers, aside from those having moneyed interests in the docks, should join the vessel owners in trying to secure some understanding as to what may be expected for next season. The railways operating between mines and upper lake shipping ports have reduced freights, and the ore business must adjust itself to the condition with which it is confronted by a general lowering of carrying and handling charges. A reduction in the cost of taking ore out of the vessels will not result to the direct advantage of the vessels. It will simply be another step towards reducing the cost of ore delivered at the furnaces to a basis where business can be done under the new order of low prices that is certain to prevail in the iron business of the future.

WITHIN the past year there has been formed in this country an organization that bids fair to rival the British Institute of Naval Architects. Our navy, leading in the adoption of triple-screws, has turned out the fastest cruiser in the world, the Columbia. Our mercantile marine, even on the lakes, has realized the advantages of twin screws and has adopted to them more readily than they were adopted by the merchant shipping interests of Great Britain. The Cramps are preparing to send out American-built ships to compete with British "greyhounds" on the Atlantic, and the 'liners" Paris and New York, which recently adopted our flag, are to receive their annual overhauling in an American ship yard at Newport News, Va. These are a few marks of progress in the return to American ships on the ocean.

GOVERNOR FLOWER and the retiring state engineer of New York, Mr. Schenck, express widely different views of the canal question in their annual reports, just issued. It would seem, however, that the reports are of little importance outside of New York state, as the shipping interests of the northwest, that have most to look for from the Erie canal, have given up all hope of a suitable improvement of it by the state. Governor Flower again favors electric motive power, while the engineer frowns upon the talk of any advantage being secured from this sourse. Both officers show a fear of great cost in their recommendations for improvements, and of course the inability of the state to provide a waterway that would be suitable to the national demands that now exist is the great secret of difficulty. Of the proposed ship canal survey the engineer says: "While an advocate of the proposed survey being made and the results published by the government as a welcome addition to our general fund of useful knowledge, I do not wish to be understood as advocating government control of our state canals. To anyone who has given the matter serious study it must be very apparent that it would be unsafe to transfer to the general government the control of our state canals, and whatever improvements or enlargements are to be made ought to be by the state with government aid if possible, but without such aid, if in order to secure it proprietorship of our waterways must be relinquished."

IT IS to be feared that unless some of the leaders among the members of the Lake Carriers' Association go to the annual meeting in Detroit next week with some well defined plan of action to present on the question of regulating freight charges, the subject will become so complicated in discussion that nothing will come of the talk of two months past. Coal and ore shippers are in many cases favorable to the maintenance of fair freight rates, and the men who are openly advocating combined action are among the leading vessel owners on the lakes. It is certain, however, that a great deal of valuable time will be lost in talk, with prospects of the whole scheme being defeated on account of delay, unless some of the men who have been recognized as leaders in the past decide upon a policy that will show at the outset how far owners are willing to go into the combination.

SENATOR LODGE has a bill in congress providing that laws relating to life saving appliances as now applied to steam vessels shall apply also to sail vessels. Mr. Lodge would have the present steamboat inspectors look after the sail vessels also. It is not probable, however, that his bill will become a law. Tariff legislation and other subjects of great importance will take up the time of the present congress, and measures of the piece-meal kind, such as this is, will not receive support from the shipping interests. If any changes are to be made in the laws relating to government supervision of the merchant marine, the sentiment is certainly favorable to a radical change, as far as the inspection service is concerned.

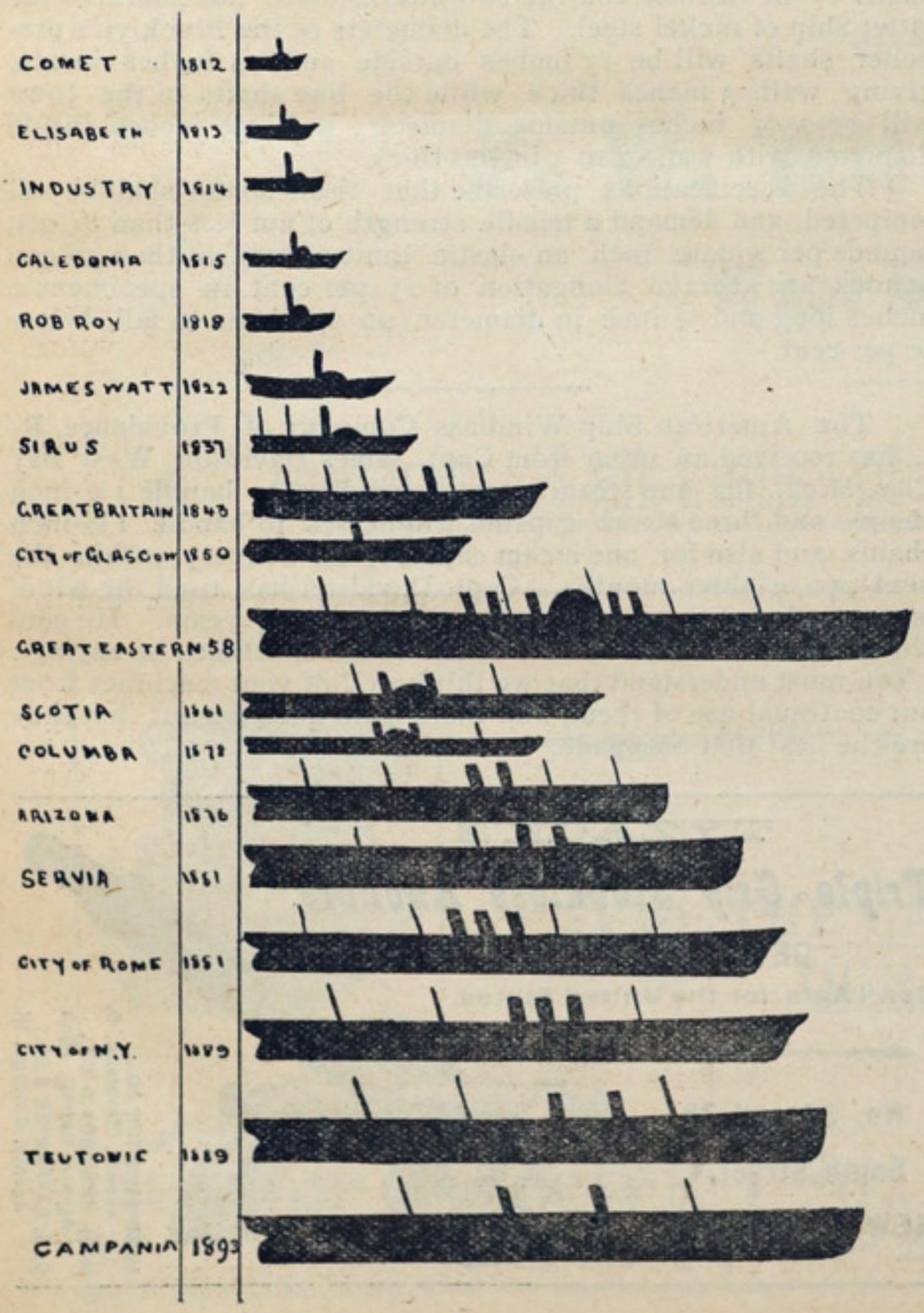
IN outward or shell construction the new American line ships building at Philadelphia will be like the Majestic and Teutonic, while inwardly they will be similar to the Paris and New York. It is probable, then, that the lapping of plates on these boats may lead to a more general adoption of the system in this country.

Mr. T. E. Edison, the famous electrician, is sometimes credited with droll remarks and bad grammar, but there is usually in his sayings a deal of truth and common sense. If he had five years ago told people respecting aluminium, "there is nothing in it," as he is credited with saying, he might have saved newspaper editors from their assinine proposals to construct ships, railways, trains, bridges and what not, of this white metal. About the only use of aluminium we have seen that appealed to mechanical fitness, was for engineers' instruments, and even this was an alloy. "It is cheaper now than brass," Mr. Edison says, and this is true, because its volume compared to brass for a given weight is about as 26 to 8.5. With aluminium at 50 cents a pound, brass should be less than 16 cents a pound to match, which it is not, for machine parts at least. Aluminium has caused a fearful waste of ink and adjectives, but not in this journal as our files will prove.—Industry, San Francisco.

Evolution of the Atlantic Steamship.

We are indebted to Constructing Engineer Souter of the Cleveland Ship Building Company for the diagram and extensive tabulated data on this page covering the evolution of the Atlantic passenger ship. Mr. Souter does not claim that the diagram is original, but the whole matter is valuable in that it has been brought up to date. Dr. Elgar, president of the British Institute of Naval Architects, published a similar diagram in one of his books on ship building. The tabulated matter is self explanatory.

NAME.	LINE.	DIMENSIONS LENGTH	BRDTH	DEPTH	ENGINES I.H.P.	CYLINDERS	STROKE	BOILERS GRATE SUR. TOTAL	HEATG SUR.	PRESSURE	NUMBER.	SIZE	DISPLACEMENT	PROPELLER.
CITY OF ROME	ANCHOR.	542'6"	52'	216' DFT	11890	3-46 & 3-86	72	1398	29256	90			11250	
NORMANDIE	FRENCH	459'4"	48' 11"	19'10"	6959	3-35 & 3-75	67	756	21404	85	8		7975	22'x32'
ARIZONA	STATE	450'	45' 1½"	18'3"	6500	1-62 & 2-96	66	780		90	7		6415	25'x
ORIENT	ORIENT.S.N.CO.	445'	46'	21'4"	5453	1-60 & 2-85	60			75			7770	
STIRLINGCASTLE	SKINNER&CO.	420'	50'	22'3"	5396	1-62 & 2-90	66	757	21161	100			7600	
ELBE	N.GER LL'DS.	420'	44'9"	20'	5663	1-60 & 2-85	60						6350	
UMBRIA	CUNARD	500'	57'	22'6"	14321	1-71 & 2-105	72	1606	38817	110			9860	
ETRURIA	"	"	"	"	"	" " "	"	"	"	"			"	
AURANIA	"	470'	"	20'	8500	1-68 & 2-91	"	1001	23284	90			8800	
AMERICA	NATIONAL	432'	51'	26'	7354	1-63 & 2-91	66	892	22730	95			6500	
SERVIA	CUNARD	515'	52'	28'8"	10300	1-72 & 2-100	78	1014	27483	90	7		10960	24'x356
ALASKA	GUION	500'	50'	21'	10500	1-65 & 2-100	72			100			9210	
EMS	N.GER.LL'DS.	430'	46'10"	20'7"	7251	1-62 & 2-86	60	780	19700	"			7030	
ALLER	" "	438'	48'	21'	7974	1-44 1-70 1-100	72	799	22630	150			7447	
ORMUZ	ORIENT.S.N.Co.	465'6"	52'1½"		9000	1-46 1-73 1-112	"	850	26000	"				
LAHN	N.GER.LL'DS.	448'6"	49'		9500	2-32 1-65 2-85	"							
CITY OF NEW YORK	INMAN&INT'NL	565'	63'3"	42'HD	19000	2-45 2-74 2-113	60	1293		"				22 2/8 x 28
CITY OF PARIS	" "	"	"	"	"	" " "	"			"				"
TEUTONIC	WHITE STAR	582'	57'6"	39'4"	17000	2-43 2-61 2-110	"	1163		180	12	12'6"x11'	16825	21'6"x 28'6"
COLUMBIA	HAMB' AM.	463'	56'	38'6"	12500	2-48 2-66 2-101	66	1220	35000	150	9	11'3"x15'6"	10000	16 2/32
ORIZABA	PAC. S N.CO.	460'	49'3"	35'	6000	2-40 2-66 2-100	72				6			
ORMUZ	ORIENT.S.N.CO	482'	52'	37'		2-46 2-73 2-112	"			"	"			
CAMPANIA	CUNARD	622	65	41.6	30000	2-37 1-79 2-98	69				12 1 1	18x17 18x11 10x10		



No Duty on Fuel Secured in Canada.

The collector of customs at Detroit a short time ago submitted to the treasury department the question whether it is not an infraction or evasion of the customs laws for American boats, running between upper and lower lake American ports, to take on coal at Canadian ports in the Detroit river as fuel and consume the same in American waters without payment of duty thereon. The question is a new one, although the practice of getting fuel at Canadian ports has been common for years past. In the latest list of printed decisions, Assistant Secretary Hamlin holds that there is no infraction or invasion of the law, provided the coal is regarded strictly as a part of the vessel's stores and none of it is unloaded.

New Officers Among the Shipmasters.

Officers of the Toledo lodge, Shipmasters' Association, elected recently, are: President, T. C. Herrick; first vice-president, William Lever; second vice-president, D. Stalker; treasurer, Charles Hubbard; financial secretary, Al. Fitts; recording secretary, E. G. Ashley.

Branch No. 2, Port Huron, Mich.: President, William A. Hutchinson: first vice president, W. E. Rice; second vice president, D. Hutchinson; treasurer, Edmund Fitzgerald; recording and financial secy.,G. W. Pierce; marshal, P. F. Powrie; warden, H. Maitland; sentinel, L. E. Carey; chaplain. B. H. Cooper.

Officers of the Marine City lodge, Shipmasters' Association, recently elected, are as follows: President, G. A. Shaw; first vice president, Wm. Burns; second vice president, Wm. Tomlin; treasurer, R. A. Cottrell; financial secretary, W. H. Scott, recording secretary, J. A. Ward; chaplain, T. C. Walker; marshal, Wm. Hagan; warden, Geo. Fish; sentinel, Andrew Yax; representative to grand lodge, G. A. Shaw.

Another Big Towing and Wrecking Boat.

Special Correspondence to the MARINE REVIEW.

KINGSTON, Ont., Jan. 11.—The Calvin Company's towing and wrecking steamer Reginald was launched Saturday. She is 108 feet keel, 118 feet over all and 21 feet 4 inches beam. Her engines are of the compound inverted type, with cylinders 17 and 34 inches and a common stroke of 26 inches. Her cranks are set at right angles The boiler, built by John Ingles & Son, Toronto, is of the Scotch type, 11 feet 6 inches in diameter and 12 feet long, with 182 tubes, 3½ inches diameter and 9 feet long. There are three furnaces, and the working pressure of the boiler is 140 pounds to the square inch. The engines are being built by the Calvin Company in their shop at Garden Island, and are expected to develop about 800 horse power. An independent air pump and condenser and other modern appliances are features of the machinery The boat will also be fitted with steam windlass and capstan, for raising anchors, hauling in tow-lines, handling steam pumps and other wrecking appliances.

Marine Shafting and Engine Forgings—Nickel Steel.

It may be said that in the manufacture of this class of heavy steel forgings, it is not yet the usual practice to aim at the highest attainable combination of physical qualities, and that therefore, there is a wide field for improvement in this direction. From this statement, it must not be inferred that the demands of the United States navy specifications, which may now be taken as the standard in this country, are not such as to insure an excellent quality of steel; on the contrary, the conditions of inspection are rigorous, the amount of testing large, and the physical qualities demanded are such as can only be obtained by the use of high grade stock, by ample forging facilities, and by careful manufacture throughout. The present physical requirements for shafting, including cranks, are: Tensile strength not less than 58,000 pounds per square inch, and an average elongation of not less than 28 per cent. in longitudinal specimens ½ inch diameter and 2 inches long, cut from full-sized prolongations of forgings. For connecting and piston rods, a somewhat harder steel with a tensile strength of not less than 65,000 pounds per square inch, and an elongation of not less than 25 per cent. is used. No treatment other than annealing is prescribed, and the elastic limit is not considered as a condition of acceptance. From these requirements it will be seen that a distinctly soft steel is being used, in which the elastic limit often falls to about 27,000 pounds per square inch, and averages something over 30,000 pounds. In adopting such soft steel, the practice of the English admiralty and merchant marine has been followed, and in view of the fact that this practice is based upon wide experience, and the use of a very large amount of material, much of which has done excellent service, it has been a wise and conservative course to make no hasty and radical departures from same.

It must indeed be conceded that soft steel presents, in some respects, marked advantages as the standard material for shafts and engine forgings, particularly when the manufacture is entrusted to forges having insufficient facilities and lack of experience in handling the harder classes of steel. In the ingot form and during forging, soft steel can bear with safety rougher treatment than harder steels; it is less sensitive to the hurtful effects of irregular and repeated heatings, and dangerous internal strains and defects are less apt to be developed thereby; these are important considerations, especially in the case of forgings of irregular shape, such as solid forged cranks, connecting rods, etc. Further, by the use of soft steel the cost of machining, and hence the cost of finished forgings is reduced to a minimum. It is natural, therefore, that marine engineers should hesitate to make a change in a matter of such importance, feeling as they do, that in soft steel forgings, there is an element of safety that can not be overlooked. In calculating the dimensions of marine engine forgings the elastic limit of the material used has not been as important a factor as in the designing of heavy guns; this is principally due to the larger factor of safety used in engine forgings to insure stiffness or rigidity of parts under transverse strains. There is much evidence at hand, however, to indicate that the importance of a high elastic limit in steel forgings has not been sufficiently considered, and that many failures of soft steel forgings of excellent quality can be ascribed to a low elastic limit. A notable instance is that of locomotive crank-pin forgings, where soft steel has in many cases failed by breakage as frequently as wrought iron, and where a harder steel with higher elastic limit has given far better results. The length of service of hammer piston rods has also been much increased by the use of steel of high elastic limit. These are instances of machine parts subjected to exceptionally severe working strains.

In the highest development of the modern marine engines reduction of weight of all parts is of prime importance. This can only be accomplished by reducing sectional areas. On the other hand, outside dimensions can not usually be reduced without sacrificing necessary stiffness. We are, therefore, led to removing the metal along the neutral axes or, in other words, to the use of hollow forgings. This practice has been followed in designing the shafting of all the ships of the new navy, except the four Roach ships. In most cases, however, the danger of too great a reduction of sectional area has evidently been feared, and the diameters of axial holes have been made too small to allow of advantageous hollow forging on a mandril. Solid forging with subsequent boring has, therefore, been necessary, whereby a distinct loss in quality of metal has occurred. It is evident that to reduce further relative weights as well as to increase the absolute strength of parts, the designer of marine engines needs a stronger material than that now employed; that is, a material having a greater elastic limit, but at the same time possessing such a degree of toughness as to insure resistance to sudden strain or shock. Such a material can be found in steel harder than that now used, strengthened and toughened by tempering and annealing. Simple steel of the proper natural hardness, and so treated, will show in specimens cut from the center of sections, say 3 inches to 6 inches thick, an elastic limit of about 45,000 pounds per square inch, an elongation of about 23 per cent. in 2 inches, and a contraction of area of from 50 to 55 per cent. To allow of safe and effective tempering, forgings must be made hollow wherever possible, rectangular sections reduced in thickness as far as practicable, large fillets used, and sharp reentering angles, and sudden changes from thin to thick sections avoided. In shafting, axial holes should be made large enough wherever practicable to allow of hollow forging, and additional strength with the same weight obtained by increasing both outside and inside diameters, and thus reducing thickness of walls.

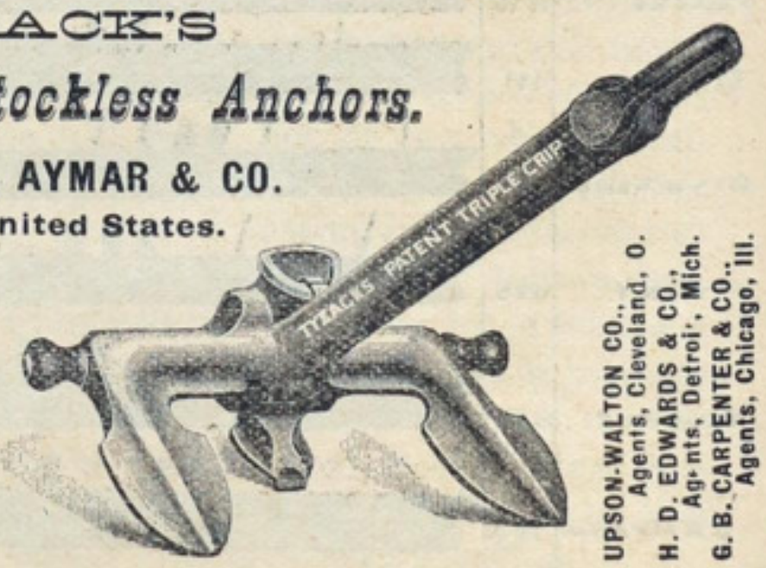
A further and very pronounced improvement in strength and toughness can be obtained as already indicated, by the use of nickel steel, tempered and annealed and prepared for treatment as above described. The use of nickel allows a reduction of carbon, makes the steel more sensitive to temper, and facilitates the tempering of irregular shapes. Specimens from nickel steel forgings, tempered and annealed, will show uniformly an elastic limit of from 50,000 to 55,000 pounds per square inch, an elongation of 23 per cent. and above, in specimens 2 inches long and ½ inch in diameter, and a contraction of area of from 55 to 60 per cent. In cases where owing to thickness of section and irregular shape, tempering is not advisable, nickel steel will still show a higher combination of elasticity and toughness than any other material known under the same conditions. Here, then, is a material admirably suited to the shafting and engine forgings required by the marine engineer in the construction of modern high service engines, and it is believed that as its merits become known, its use will be widely extended.

The bureau of steam engineering has already taken this material into consideration, and in designing the shafting of the Brooklyn and Iowa, it was decided to make the two propeller shafts of the former and the two intermediate line shafts of the latter ship of nickel steel. The diameters of the Brooklyn's propeller shafts will be 17 inches outside and 11 inches inside, giving walls 3 inches thick, while the line shafts of the Iowa will be 15¾ inches outside diameter, and 9¾ inches inside diameter, with walls also 3 inches thick.

The specifications prescribe that these shafts shall be oil tempered, and demand a tensile strength of not less than 85,000 pounds per square inch, an elastic limit of not less than 50,000 pounds, an average elongation of 23 per cent. in specimens 2 inches long and ½ inch in diameter (no specimen to fall below 20 per cent.

*From a paper by Russell W. Davenport, on "Production in the United States of Heavy Steel Engine, Gun and Armor Plate Forgings," read before the Society of Naval Architects and Marine Engineers.

The American Ship Windlass Company of Providence, R. I., has received an order from Capt. James Davidson, West Bay City, Mich., for one steam capstan windlass to handle 1¾-inch chains, and three steam capstan windlasses to handle 1½-inch chains, and also for one steam capstan, for delivery within the next two or three months. Capt. Davidson has used the windlasses made by this company for nearly twenty years. He concludes the letter in which he orders these machines by saying: "You must understand that we think well of your machines from our continual use of them, and there is no question but that they are the best that are made."

TYZACK'S
Triple-Grip Stockless Anchors.
DE GRAUW, AYMAR & CO.
Gen'l Agts. for the United States.
No. 34 and 35
South Street,
NEW YORK CITY.


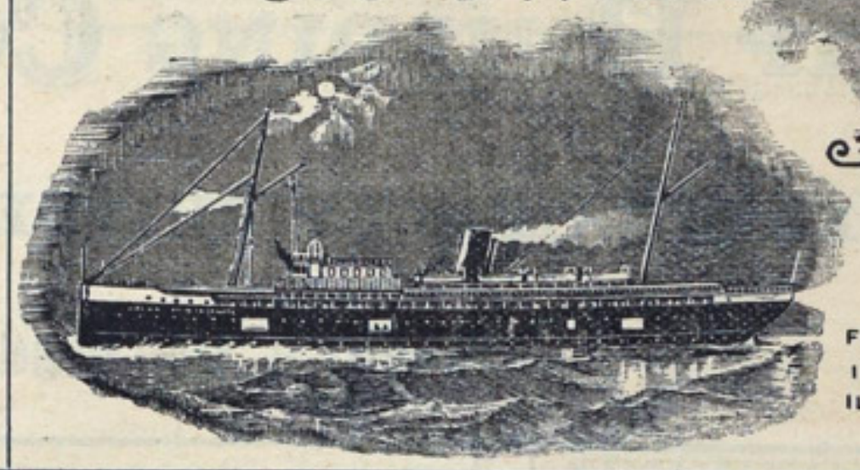
UPSON-WALTON CO., Agents, Cleveland, O.
H. D. EDWARDS & CO., Agents, Detroit, Mich.
G. B. CARPENTER & CO., Agents, Chicago, Ill.

Do you want to give to a vessel owner, master or ship builder a present that will be appreciated.

Send $5 for PATTERSON'S NAUTICAL DICTIONARY.

MARINE REVIEW,
516 Perry-Payne Bldg.,
Cleveland, O.

E. S. Richardson Fueling Co.

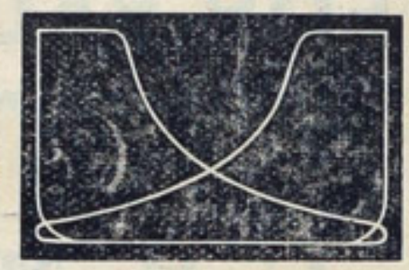


COAL

DOCKS
FOOT NO. MARKET ST
18TH ST. BRIDGE,
ILLINOIS CENTRAL SLIP "C"

OFFICE. 54 LA SALLE ST.
CHICAGO ILL.

MAKE YOURSELF A
MECHANICAL ENGINEER
OR DRAUGHTSMAN;



or qualify to take charge of, or superintend the manufacture of machinery, by devoting your idle hours to HOME STUDY by the method or

The Correspondence School of Mechanics,
SCRANTON, PA.

The course embraces Arithmetic, Algebra, Geometry, Trigonometry, Elementary Mechanics, Hydromechanics, Pneumatics, Heat, Mechanical Drawing, Steam and Steam Engines, Strength of Materials, Applied Mechanics, Boilers, Machine Designs, Electricity, etc. To begin, students need only know how to read and write.

MODERATE CHARGES. SEND FOR FREE CIRCULAR. DIPLOMAS AWARDED.

FOR SALE

STEAMER JOSEPH L. HURD,

well adapted for package freight or lumber traffic, also one or more of the fine passenger and freight steamers of this company's fleet, now laid up in Chicago, Ill.

Lake Michigan & Lake Superior Transportation Co.
7 Rush Street, CHICAGO, ILLS.

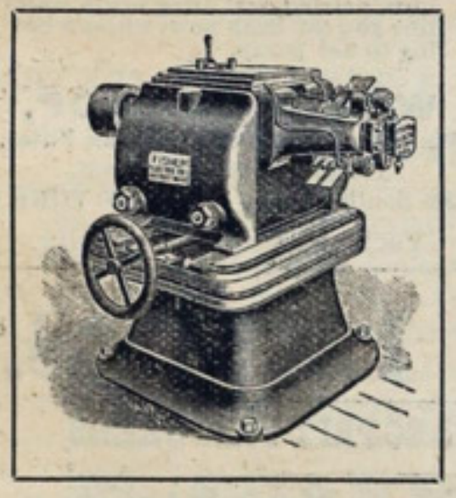
Nautical Steam Laundry
No. 100 RIVER STREET.
SPECIAL ATTENTION GIVEN TO MARINE WORK.
OPEN DAY AND NIGHT.
Telephone 2558
CHARLES M. SWARTWOOD, Proprietor.

FOR SALE.

STEAMER H. E. RUNNELS, capacity 800 thousand on 12 feet draft.
STEAMER DESMOND, capacity 450 thousand on 10 feet draft.
Also, WRECK OF S. C. CLARK, including engine and boiler. We would rebuild same at reasonable terms.
Address, JENKS SHIP BUILDING CO., Port Huron, Mich.

F. W. WHEELER, President.
E. T. CARRINGTON, Vice-President.
F. L. GILBERT, Secretary.

F. W. WHEELER & CO.,
WEST BAY CITY, MICH.
Builders of all kinds of METAL AND WOODEN SHIPS.



"Ninety per cent. of the Electric Lighting Plants on the inland lakes have been installed by the Fisher Co., of Detroit, Mich.

ALL THE GREAT FLEETS ARE EQUIPPED WITH OUR PLANTS.

Fisher Electric Co., 183-185-187 Larned St., W. Detroit, Mich.

WILLIAM L. BROWN, PRESIDENT. W. F. COBB, VICE-PRESIDENT. W. I. BABCOCK, MANAGER. O. R. SINCLAIR, SECRETARY.

CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.
Ship Yard Office, "South Chicago 40."
Chicago Office, 1013 Rookery, "Main 3447."

STEEL STEAM-SHIP BUILDERS,

101st St. and Calumet River, SOUTH CHICAGO, ILL.

AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

CHAINS.

Our DREDGE and CRANE CHAINS are made of IRON ROLLED SPECIALLY for that purpose. Send for Price List

J. B. CARR & CO., Manufacturers, TROY, NEW YORK.

THOS. DREIN & SON, TATNALL AND RAILROAD STS., WILMINGTON, DEL.

Builders of Metallic Life Boats and Rafts, Yachts and Pleasure Boats LifePreservers. Outfit for Lake Steamers a Specialty.

THE "CINCINNATI" AUTOMATIC STEAM STEERING GEAR

A Simple, Powerful Machine. Noiseless and Sure.

SEND FOR CIRCULAR.

CRAWLEY & JOHNSTON,
119-121-125 E. Pearl St., CINCINNATI, OHIO.

GEORGE B. CARPENTER. ESTABLISHED 1840. BENJAMIN CARPENTER.

GEO. B. CARPENTER & CO.

Ship Chandlers and Sail Makers.

CORDAGE, TWINES, COTTON DUCK,
MILL, RAILROAD and VESSEL SUPPLIES.

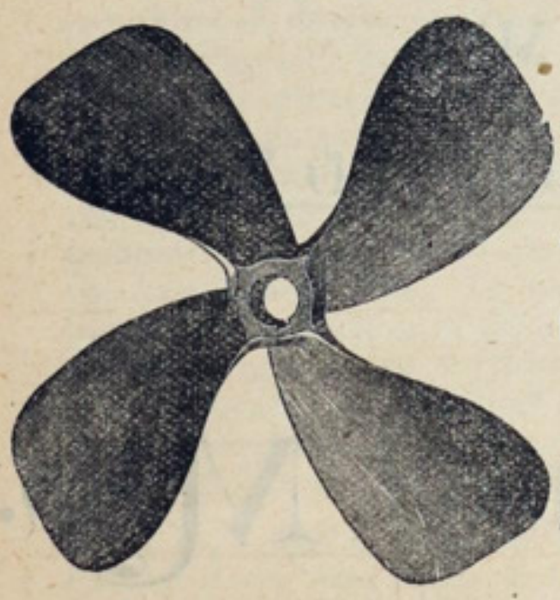
202, 204, 206, 208 So. WATER STREET,
CHICAGO, ILL.

H. G. TROUT,
KING IRON WORKS,

BUFFALO, N. Y.,

MANUFACTURERS OF

TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT And STEEPLE COMPOUND MARINE ENGINES,



High and Low Pressure Engines, Sectional, Propeller, Tug and Yacht Wheels.

Cowles Aluminum and Manganese Bronze Propeller Wheels.

These Wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

FOR SALE.

FIRE BOX BOILER, 8 by 14 Feet, Allowed 110 Pounds of Steam.

Five Years Old Will Sell Reasonable.

Enquire of H. W. McCORMICK, Bay City, Mich.

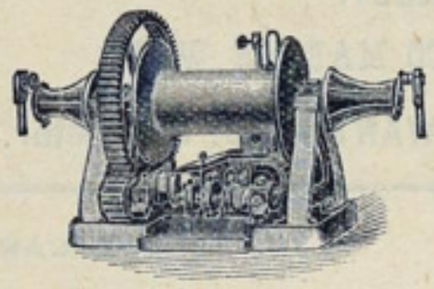
C. H. McCUTCHEON,

(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 68. No. 18 Ohio Street BUFFALO, N. Y.



JACKSON & CHURCH,

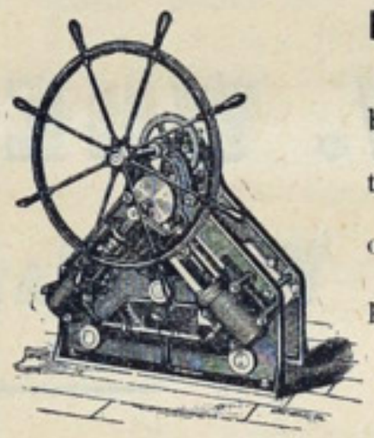
Builders of DUPLEX HOISTING and DECK ENGINES.

Plain Finished and Automatic ENGINES, From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, Marine & Locomotive BOILERS Strictly First-Class and Highest Test.

Send for Circulars and Prices. SAGINAW, MICH.

SHERIFFS STEAM STEERER.



MADE IN TWO SIZES.

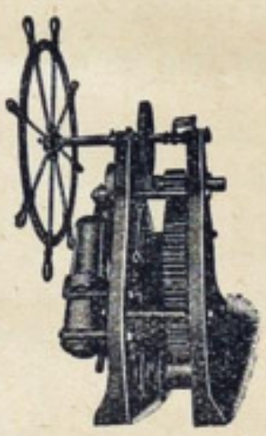
Are easy to adjust and can be handled by any one.

The Steerer can be arranged to set in pilot house or aft.

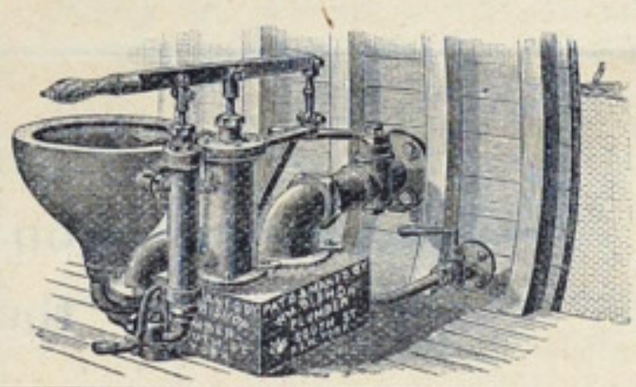
No Steerer will be sold without a quadrant.

Steerer will be sold on approval.

Manufactured by
SHERIFFS MFG. CO.,
126-130 Barclay Street,
MILWAUKEE, WIS.



COMBINATION PUMP WATER CLOSET



For Yachts, Pilot Boats, Naval Ships, Etc.

For above or below water line. No tank needed, and when below water line you can flush bowl without having to use pump.

WILLIAM BISHOP,
Plumber, Coppersmith & Steam Fitter,
Telephone 4811 Cortlandt,
205 South Street, NEW YORK.
Yacht Fittings a Specialty.

SHIP LAMPS.

OIL AND ELECTRIC FIXTURERS

FOR

Steamships, Yachts, &c.

GREAT VARIETY OF DESIGNS.
Prices and Cuts on Application.

PAGE BROS. & CO.,

(FORMERLY WILLIAMS, PAGE & CO.)

227 to 233 Cambridge St., BOSTON, MASS.

"PL" DIXON'S "PL" GRAPHITE.

Dixon's Perfect Lubricating Graphite is indispensible to every engineer and machinst. It can be used dry or mixed with water, oil or grease. We send free of charge a sample and pamphlet with interesting and instructive information.

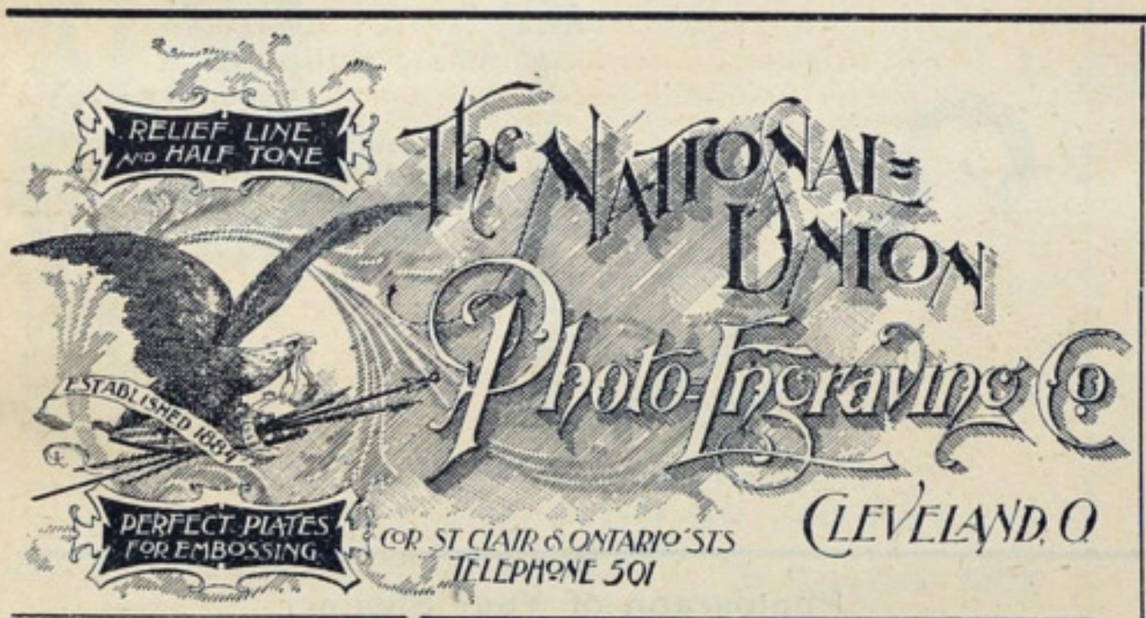
JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

"The man who knows so much about his profession that he cannot learn something about it by reading and study, has a very small profession or a very large cranium."

Marine and Mechanical Literature and Periodicals.

	Per Year.
Nautical Dictionary, [Patterson]	$ 5 00
Nautical Dictionary and Marine Review	6 00
Engineering, [London], Weekly	10 00
Engineering, [London], Weekly and Marine Review	11 00
The Engineer, [New York], Semi Monthly	2 50
The Engineer. [New York], and Marine Review	4 00
Engineering, [New York], Monthly Magazine	3 00
Engineering, [New York] and Marine Review	4 00
American Shipbuilder and Marine Review	3 00
Emerson Binder, [that will hold 52 Nos. of the Marine Review]	1 00

MARINE REVIEW,
516 Perry-Payne Bldg., CLEVELAND, O.



1880. 1893

CHAS. H. POTTER & CO.,

Investment Bankers,

Cleveland, O.

Dealers in

Lake Superior Iron Mining Stocks,

on about 10 per cent. annual dividend basis, Republic Iron Co., Lake Superior Iron Co., Champion Iron Co., Minnesota Iron Co., Jackson Iron Co., Cleveland-Cliffs Iron Co., Chandler Iron Co., Chicago and Minnesota Ore Co.

CONNELLY BROS. & CO.

OHIO, Cor. Michigan St., BUFFALO, N. Y.

SHIP CHANDLERY, PAINTS, OILS,

AND VESSEL SUPPLIES.

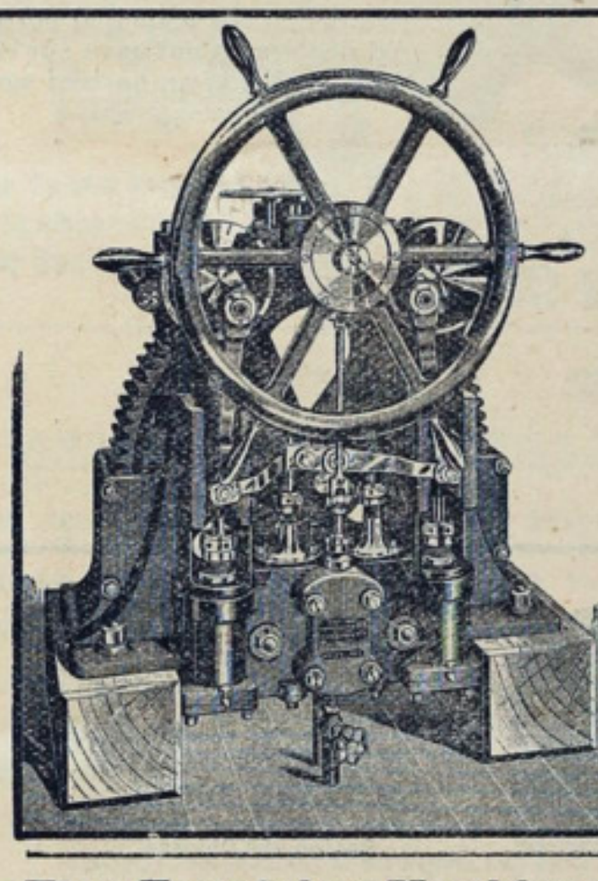
ST. MARY'S RIVER CHARTS NOS. 1 AND 2 FROM POINT IROQUOIS TO E. NEEBISH AND FROM MUD LAKE ENTRANCE TO E. NEEBISH, CORRECTED TO AUG. 30, 1892, CAN BE HAD AT THE OFFICE OF THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, FOR 20 CENTS EACH, OR BOTH BY MAIL FOR 50 CENTS. BOTH CHARTS WILL BE FURNISHED WITH CLOTH BACKS AND BOUND EDGES FOR $1.50.

H. CHANNON COMPANY,

General Ship Chandlers and Sail Makers,

Dealers in Manilla Rope, Wire Rope,
Tackle Blocks, Cotton Duck, Anchors, Chains, Etc.

24-26 MARKET STREET, CHICAGO, ILL.



No. 4 BECK
Steam Steering Gear.

Extracts from Letters.

"THE steering gears of the lakes."
Capt. Higgie, V. O. T. Co., Chicago.

"Cannot be excelled."
Capt, Cochran, Steamer Marion.

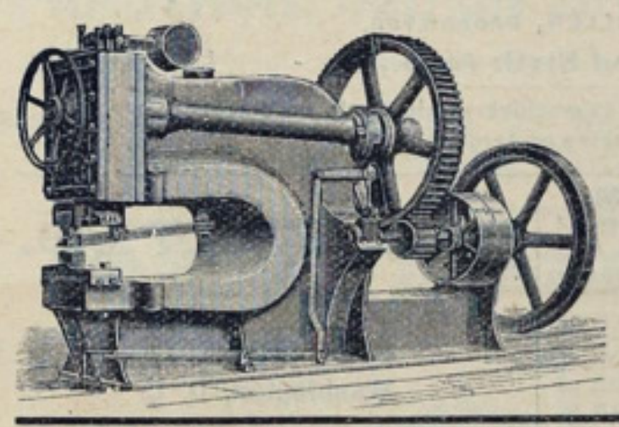
"Gives entire satisfaction."
Independent Tug Line, Chicago

"Are giving excellent satisfaction."
Milwaukee Dredge Co.

"The No. 4 Beck Steering Gear put in our steamer, Samuel Mather, has given excellent satisfaction."
W. L. Mahon, Mech'l Eng'r, American Steel Barge Co.

PAWLING & HARNISCHFEGER,
156-168 Clinton Street,
MILWAUKEE, WIS.

The Excelsior Machine and Cleveland Punch and Shear Works Co.



SUCCESSORS TO
LEICHTON & HATHAWAY.
Manufacturers of
Punches, Shears, Bending Rolls, Rotary Planers, Overhead & Post Drill Presses.

980 to 986 Hamilton St.,
CLEVELAND, OHIO.

MARINE REVIEW LINER EXCHANGE.

Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind or wishing to purchase vessels, are invited to take advantage of the same offer. Employers in need of professional men or men who want positions may avail themselves of the opportunities offered. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed MARINE REVIEW, 516 Perry-Payne Building, Cleveland, O.

231—WANTED—Three to six steamships capable of handling from three to four tows each.

232—WANTED—Capitalist to interest himself in a valuable marine patent.

233—FOR SALE—Steamer Jos. L. Hurd, suitable for package freight or lumber.

235—FOR SALE—Steamer H. E. Runnels; capacity 800 thousand on 12 feet draft. Steamer Desmond; capacity 450 thousand on 10 feet draft. Also wreck of steamer S. C. Clark, including engine and boiler.

236—WANTED—Large tug with engine about 24 x 24.

A Fraction

Of a turn a minute gained or lost means pounds of coal wasted or saved. How many pounds depends upon the length of a trip, but it's tons in a season. Now, why do you use oil? Simply to save fuel. That's your object, no matter what oil you use. Then if one oil saves more fuel than another, the oil that saves the most fuel is the cheapest to use.

VACUUM OIL COMPANY, Rochester, N. Y.

MARINE OILS

In stock at the principal ports.
All dealers do not have our oils.
Send for list of authorized agents.

JENKINS STANDARD PACKING

For Steam or Joint Packing has no superior. It is manufactured in all thicknesses. It is not LOADED to increase weight. Does n t ROT or BURN OUT. Every sheet is stamped with Trade Mark, like cut.

JENKINS BROS.,
New York, Philadelphia,
Boston and Chicago.

Lorain Machine and Repair Shop,

ED. A. FULLER, PROPRIETOR,
Broadway, between Fifth and Sixth Aves., - LORAIN, O.

Shop well equipped for repairs to machinery while boats are discharging and taking on cargoes.

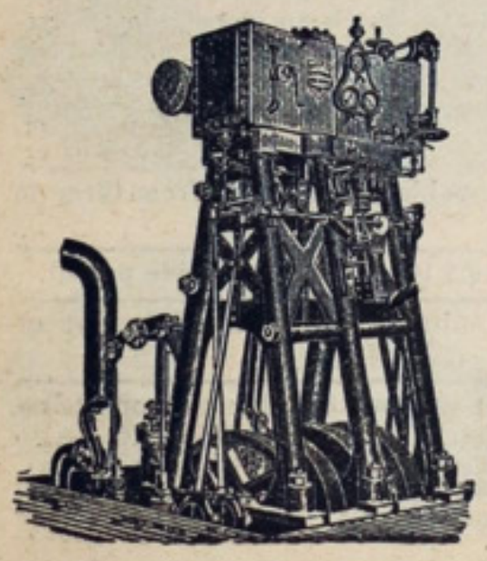
EDWARD C. WEAVER, LL. M.,

900 F. (op. Pat. Office.) Washington, D. C. Attorney and Counsellor in Patents, Trade Marks, Revenue Claims and all claims against the U.S. Make a clear statement of your invention or claim, and I will advise you free of charge. Send stamp for my phamphlet.

PATENTS.

FRANK L. DYER,
918 F. Street,
Washington, D. C.

References: American Steel Barge Co.; Capt. Alexander McDougall.



J. D. WILSON. M. HENDRIE

MONTAGUE IRON WORKS,

MONTAGUE, MICH.

WILSON & HENDRIE, Proprietors.

MANUFACTURERS OF

MARINE :: ENGINES :: AND :: BOILERS,

and General Mill Machinery.

Photograph of Your Steamer.

We have one photograph of each steamer named below and will send them to any address for 75 cents each, or $1 for two to the same address. The size is 9 by 7 inches, mounted on cards of 11 by 14 inches. They are well worth the money. Address the MARINE REVIEW, 516 Perry-Payne Building, Cleveland, O:

M. H. Boyce,
Arabia,
City of Rome,
City of Naples,
City of Paris,
Virginia,
Chemung,
Pontiac,
John Rugee,
F. W. Wheeler,
Geo. F. Williams,
New York,
C. A. Eddy,
W. A. Avery,
Robt. Mills,
Conemaugh,
Gogebic,
Petoskey,
Tacoma,
J. P. Donaldson,
Lycoming,
Tioga,
S. S. Curry,
Louisiana,
W. M. Egan,
Onoko,
Albany,
Viking,
C. F. Bielman,
Topeka,
Minnesota,
S. C. Baldwin,
America,
Wissahickon,
City of Fremont,
Saml Mather,
Merrimac,
Milwaukee,
Panther,
Edward Smith No. 1.
J. C. Perrett,
Geo. Smith,
F. S. Vance,
Lawrence,
Indiana,
Thos. Maytham,
Philadelphia,
Sachem,
Florida,
R. P. Flower,
Conestoga,
Russia,
St. Lawrence,
Neosho,
Gladstone,
Caledonia,
Rosedale,
Helena.
Italia,

P. M. CHURCH & CO.,

SAVINGS BANK BLOCK, SAULT STE. MARIE, MICH

LEADING DEALERS IN

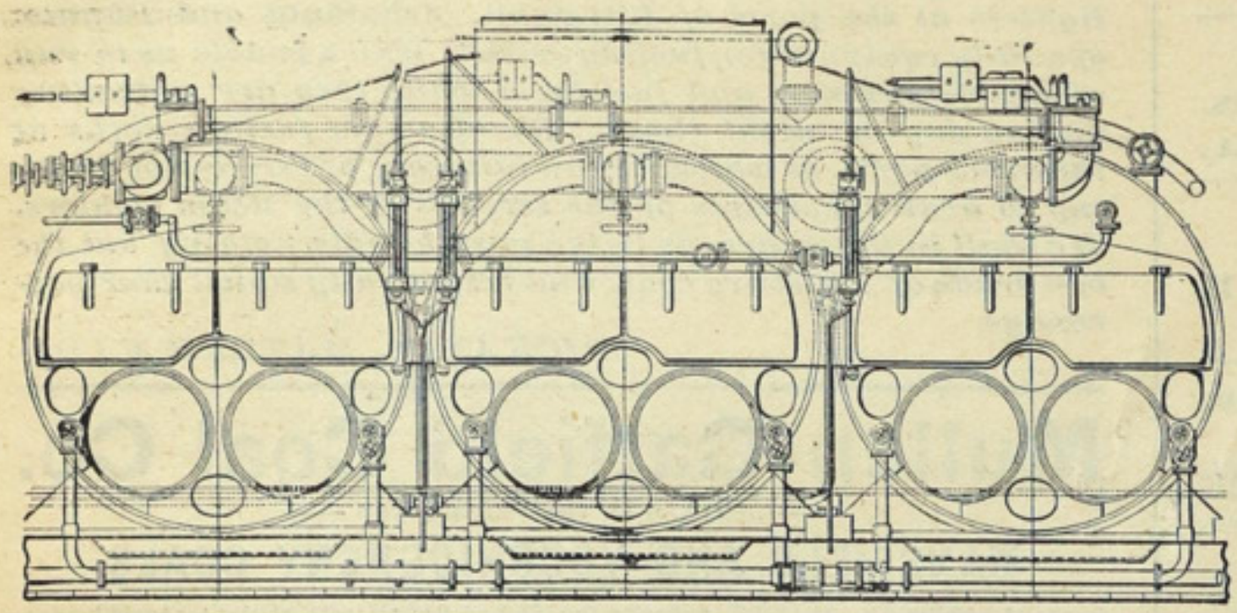
Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc.

FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

CORRECTED CHARTS OF THE ST. MARY'S RIVER CAN BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O.

LAKE ERIE BOILER WORKS, BUFFALO, N. Y.



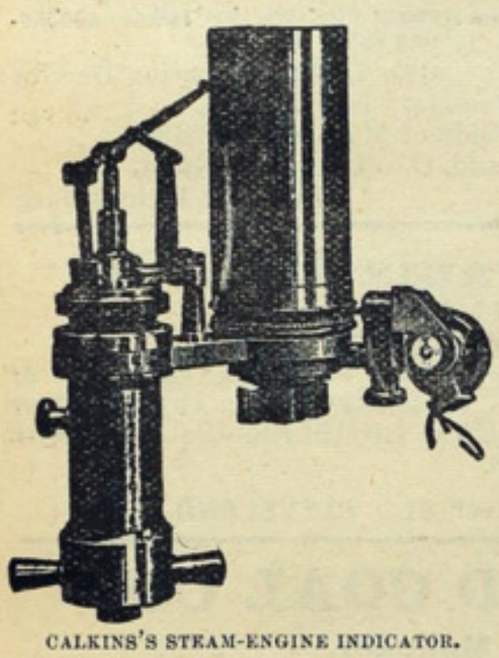
THE BEST EQUIPPED PLANT IN AMERICA

FOR THE MANUFACTURE OF

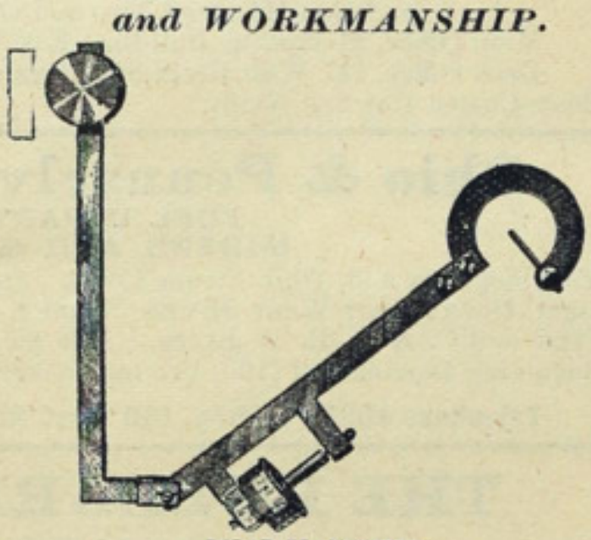
MODERN MARINE BOILERS.

FIRST-CLASS INSTRUMENTS

of APPROVED DESIGN, BEST MATERIAL and WORKMANSHIP.



CALKINS'S STEAM-ENGINE INDICATOR.



POLAR PLANIMETER.

Performance Guaranteed—NO GO, NO PAY.

LOWEST PRICES EVER OFFERED: Indicator, $25, Planimeter, $5, Pantograph, $5, Extra Spring, $2, Three-Way Cock, $5, **Or Complete Outfit with 2 Springs, $40.**

ADDRESS:

NEPTUNE METER CO., Manufacturers of Water Meters and Steam Engine Indicators,

408-409-410 Temple Court Bldg., NEW YORK CITY.

Wanted: HARBOR TUG,

[redacted]

t long, 16 feet or over beam, 9 to 11 feet
ust rate A2 or higher. Give name and

re MARINE REVIEW, Cleveland, O.

In polished case.
3 Springs and Treatise.

INDICATOR and know how to use it. Send for circular.

HINE & ROBERTSON, 40 Cortlandt St., N. Y.

He is using the best till he has tried **EUREKA PACKING** For Steam, Water and Air. Send for Sample.

NO MAN CAN SAFELY SAY

T. S. & J. D. NEGUS

Have the largest and finest stock of Nautical Instruments and Charts in the United States.

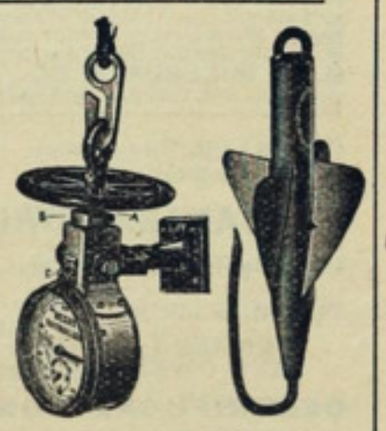
Estimates given for Outfits of Steamers and Pleasure Yachts.

Compass Adjusters.

Send for Catalogue and Almanac.

140 Water St., New York City.

Every attention given to Trade orders.



Try the new NEGUS LOG. Best in the World.

Special Agents for the Celebrated Ritchie Compass.

Operated entirely by One Handle.

No Valves required in either Steam for Suction Pipes.

THE BUFFALO AUTOMATIC.

A GRADING INJECTOR.

The movement of the steam and water valves and their relative positions are such that the supply of water will always be in proportion to the supply of steam admitted to the jets. CAN BE GRADED to run continuously on any steam presssure from 20 to 140 lbs. Operated entirely by one handle, both in stopping and starting, as well as in grading the supply of steam and water. Eagle Ejectors, Duplex Tube Scrapers, Cylinder Oil Pumps Improved Glass Oil Cups and Lubricators Compression Grease Cups, Improved Ball Gauge Cocks, and other **Steam Users' Specialties.**

Send for Catalogue, mentioning this paper.

SHERWOOD MFG. CO., (Sole Mfrs.) BUFFALO, N.Y

BOOKS! BOOKS!

SEAMANSHIP. By Capt. Sir George S. Nares, K. C. B, R. N. Sixth edition Revised and enlarged, with four hundred and twenty colored plates and illustrations 291 pages, 8vo., cloth, $3.00.

THE RESISTENCE AND PROPORTIONS OF SCREW PROPELLERS. By W. Bery. 4to cloth, $5 00.

THE FOULING AND COROSION OF IRON SHIPS. By Chas. F. T. Young. 8vo., cloth, $3.00.

SPON & CHAMBERLAIN, Publishers and Booksellers, 10 Cortlandt St., N. Y.

No master trading to Lake Superior should be without a chart of the north shore. We have them for sale at $1 each.

"The most perfect feed water heater and purifier we ever saw."—R. HAMMOND.

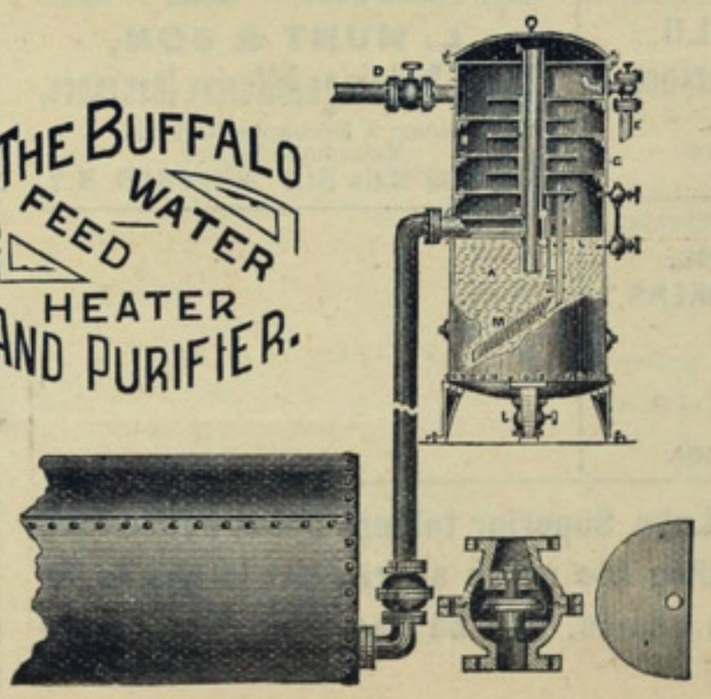
IN PRACTICAL USE ON 25 LAKE STEAMERS.

Every Purifier Warranted to Remove all Sediment or Scale-Forming Substance.

ROBERT LEARMONTH PATENTEE,

200 BOUCK AVENUE, - - - - - BUFFALO, N. Y.

THE BUFFALO FEED WATER HEATER AND PURIFIER.



REFERENCES.

A.—Settling chamber.
B.—Boiler.
C.—Feed pipe to boiler.
D.—Steam pipe.
E.—Water supply pipe.
F.—Check valve.
G.—Spray disks.
H.—Spray chamber.
I.—Equalizing tube.
J.—Blow-off pipe.
K.—Automatic shut-off valve.
L.—Division plate.
M.—Deflector and separator.

HARVEY D. GOULDER,
LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

W. H. COOK.
CAPT. J. A. CALBICK.
J. B. CLOUGH.
COOK, CALBICK & CO.
Vessel Agents and Underwriters.
Tel., Main, 56. RIALTO BLDG., No. 23 Sherman St., CHICAGO, ILL.

H. R. SPENCER,
ATTORNEY AT LAW and PROCTOR IN ADMIRALTY.
218 Superior St., DULUTH, MINN.

C. E. KREMER, Attorney and Counselor-at-Law and Proctorin Admiralty.
Rooms 14, 15 and 16, Bryan Block, - - 164 LA SALLE ST., CHICAGO. ILL.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.
MITCHELL & CO.,
Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO.
Office Telephone, 787. Reidence, John Mitchell, 3506.

C. R. JONES & CO., VESSEL AGENTS,
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN PRINDIVILLE,
Vessel and Insurance Agent,
12 Sherman Street,
CHICAGO, ILL.
Telephone, Main, 129.

C. A. Macdonald. J. J. Rardon.
C. A. MACDONALD & CO.
General Insurance Agents,
RIALTO BUILDING, CHICAGO, ILL

H. S. LORD. J. H. NORTON.
LORD & NORTON,
Attorneys-at-Law,
Proctors and Advocates in Admiralty,
DULUTH, MINN.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,
—AND—
Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND, - OHIO.

THOS. WILSON,
MANAGING OWNER
WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

C. F. Palmer. Chas. Hutchinson.
P. J. Minch.
PALMER & CO.,
Vessel Owners and Agents,
(John H. Palmer and Jonn T. Hutchinson, Associates.)
Perry-Payne Bldg., Cleveland, O.

W. A. HAWGOOD. C. C. CANFIELD.
HAWGOOD & CANFIELD,
Vessel Agents and Marine Insurance,
604-605 Perry-Payne Bldg.,
Cleveland, - Ohio.
Telephone No. 2395.

Geo. H. Macdonell. J. J. O'Connor.
Macdonell & O'Connor,
VESSEL AGENTS AND BROKERS,
Fire and Marine Insurance.
Boats consigned to our care will receive prompt despatch.
Special attention to chartering out of Port Arthur and Fort William.
Address, PORT ARTHUR, CANADA.

M. B. GARY.
O. C. PINNEY. TELEPHONE 2585.
GARY & PINNEY,
Lawyers and Proctors in Admiralty
Rooms 722 and 723 Perry-Payne Bldg.,
CLEVELAND, OHIO.

C. W. ELPHICKE. A. L. FITCH.
JAS. A. MYERS.
C. W. ELPHICKE & CO.,
Vessel Owners and Agents,
Marine Underwriters,
Rooms 10, 11 and 12, Wheeler Block, 6 and 8 Sherman St. CHICAGO.
Telephone 1194.

E. T. HITCHCOCK,
Average Adjuster,
184 Main St.,
BUFFALO, N.Y.

H. J. WEBB & CO.
SHIP BROKERS, VESSEL OWNERS and AGENTS,
Established in 1856. H. J. Webb & Co. will charter vessels for the lake trade. Special attention given to chartering vessels in the Lake Superior Iron Ore trade, both for the season and single trip.
No. 606 & 607 Perry-Payne Building, Cleveland, O. Office Telephone No. 338, Residence No 3228.

J. T. ROSE. FRANK B. LAZIER.
ROSE & LAZIER,
Vessel Agents and Brokers, and Marine Insurance,
16 Board of Trade,
DULUTH, - - MINN.

Established 1857.
THOMAS MARKS & CO.,
Merchants,
Forwarders and Shipowners,
Port Arthur, Canada.
N. B.—Special attention given to chartering vessels.

Capt. LYMAN HUNT. JAMES P. HUNT.
L. HUNT & SON,
Vessel Brokerage and Marine Insurance,
Room 9, Exchange Building.
Telephone No. 522.
No. 202 Main St., BUFFALO, N.Y.

A British chart of Lake Superior taking in the entire lake and giving detail regarding the north shore that is not to be found on United States charts, can be had from the Marine Review for $1.

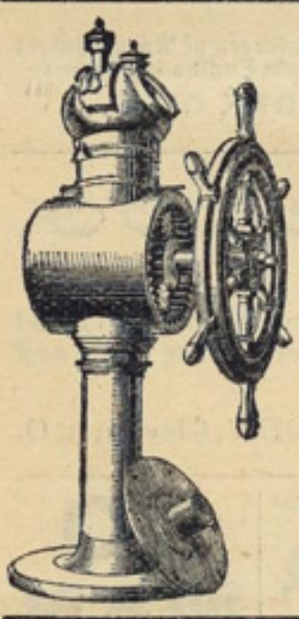
To Owners and Masters of Steam Barges.
—:o:—
We beg to call your attention to the fact that we have steam lighters at the ports of Cleveland, Ashtabula and Buffalo, specially equipped for fueling vessels, which enable us to run alongside steamers and fuel them while they are unloading during day or night time. We also have fueling docks at the above ports, at which we can take care of vessels not desiring to avail themselves of the services of the steam lighters. We shall in the future, as in the past, handle nothing but the best grade of Pittsburg coal, and respectfully solicit your patronage.
PICKANDS, MATHER & CO.

Mullen-Gatfield Coal Co.
— DEALERS IN THE CELEBRATED —
MANSFIELD AND YOUGHIOGHENY COALS.
Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling.
Elevated docks and derrick at AMHERSTBURG, ONTARIO.

THE CUDDY-MULLEN COAL CO.
Dealers in COAL. Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.
All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick and One Hundred Two and One-Half Ton Buckets.
Main Office, 81 Perkins Building, East Side of Main Street Bridge.
Dock Office, 127 West River St., Cleveland, O. Telephone No. 8.
Boats Coaled Day and Night. Docks at Amherstburg,

Ohio & Pennsylvania Coal Co.
FUEL DEPARTMENT.
MINERS AND SHIPPERS,
Youghiogheny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with Revolving Derrick and (100) two ton buckets.
Telephone 1608. Office. 130 West River St.. CLEVELAND, OHIO.

THE HUBBARD COAL CO.
S. B. HUBBARD, Manager.
WHOLESALE COAL. JACKSON OUR SPECIALTY. STEAMERS COALED.
Office with R. B. Hubbard & Son, Wholesale Lumber,
SANDUSKY, OHIO.



SNELLING'S PATENT STEERER
For Steamers, Ships, Tugs, Yachts, Coal Barges, Etc.
The drum has powerful internal gearing.
No PURCHASE BLOCKS needed.
Simple as the common "wheel and drum."
Powerful as any Screw Steerer.
An excellent relief or auxiliary gear for vessels that steer by steam.
Send for Circular.
J. H. SNELLING,
158 South Street,
NEW YORK.

GRAVURES
or
Great Northern,
L. M. & L. S. T. Steamers

PATENTS
We secure United State and Foreign Patents, register Trade-Marks, Copyrights and Labels, and attend to all patent business for moderate fees. We report on patentability free of charge. For information and free hand-book write to H. B. WILLSON & CO., Attorneys at Law, Opp. U. S. Pat. Office. WASHINGTON, D C.

CHEAP BOOKS.
Key to Engineering $0 25
Common Sense in Making Steam 0 25
Kedge Anchor, bound in cloth 2 50
Roper's Hand-Book of Marine Engines 3 00
If you want any of these books enclose money and address to
MARINE REVIEW, 516 Perry-Payne Bldg., CLEVELAND, O.

H. A. BARR, PRESIDENT, Escanaba. F. H. VAN CLEVE, SEC. Escanaba. CAPT. GEO. BARTLEY, SUPT Escanaba.
ESCANABA TOWING & WRECKING CO., Escanaba, Mich.
Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready
TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.
CENTRIFUCAL PUMPS, Seven and Fourteen Inch Suction

MECHANICAL DRAWING Taught by Mail,
Also, MECHANICS, *Mining, Prospecting, Arithmetic, etc.* To begin, students only need know how to read and write. DIPLOMAS Awarded. Low Prices. Send for FREE Circular to The Correspondence School of Mechanics, Scranton, Pa

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

—THE—

Bethlehem Iron Company

PRINCIPAL OFFICE and WORKS:

SOUTH BETHLEHEM, PENNA.

Steel Rails, Open Hearth, Bessemer and Nickel Steel Billets and Forgings.

Hydraulic Forged Shafting, Hollow or Solid.
Cranks, Rolls, Etc.

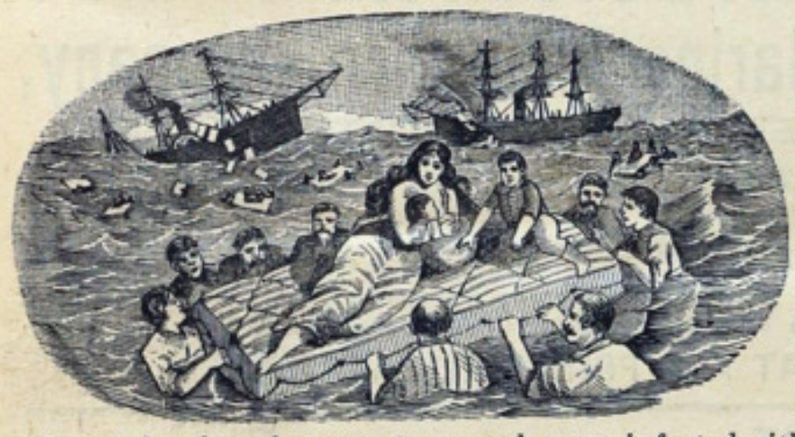
Rough Machined or Finished. Fluid Compressed Steel.

GUNS and ARMOR.

New York Office,
80 Broadway.

Philadelphia Office,
421 Chestnut St.

LIFE-SAVING MATTRESSES.



THE ONLY MATTRESS made that is essential for steamship use; fitted with life-cords, each mattress becomes a LIFE PRESERVER and will hold up twenty persons in the water. They are also especially adapted for Steamships, Yachts, etc., as they are always pure and clean, never need renovating, will not absorb moisture and cannot become infected with the germs of any contagious disease. Furthermore, they make the most comfortable bed in existence. Be sure you have your new vessels fitted entire with our goods. Write for catalogue and testimonial letters.

IMPORTANT.—We have just received official notice from the U.S. Government, that ships having our AIR MATTRESSES can carry so many less Life Preservers. Manufactured and sold only by

METROPOLITAN AIR GOODS CO., 7 Temple Place, Boston, Mass.

HORACE SEE,

CONSULTING ENGINEER AND NAVAL ARCHITECT

ONE BROADWAY, NEW YORK.

THE CONDIT FULLER CO.

CLEVELAND, OHIO.

BAR IRON, SHEET IRON, PLATE IRON, PIG IRON,
BOILER TUBES, BOILER RIVETS, PLATE STEEL,
CLINCH RINGS, GAS PIPE, BOAT SPIKES, STEEL NAILS.

Sales Agents of
THE CARBON STEEL CO.
Manufacturers of
OPEN HEARTH STEEL,
SHIP PLATES, BOILER PLATES,
ARCHES and STRAPS FOR VESSELS A SPECIALTY.
Write for Prices and List of Sizes.

ALSO ADAPTED FOR
Iron and Steel Heating,
For Hull and Boiler Plates, Tubes, Bending, Straightening and Laying Up Work.

THE "WELLS LIGHT"

WALLWORK & WELLS' PATENTS.

2000 CANDLE POWER!

ESPECIALLY ADAPTED FOR

Dry Docks and Night Loading.

PORTABLE,
ENTIRELY SELF-CONTAINED,
REQUIRES NO OUTSIDE MOTIVE POWER,
UNAFFECTED BY WEATHER,
NO SPRAY, NO SMOKE, SAFE AND ECONOMICAL.
IN USE ON 15 DRY DOCKS ON THE LAKES.

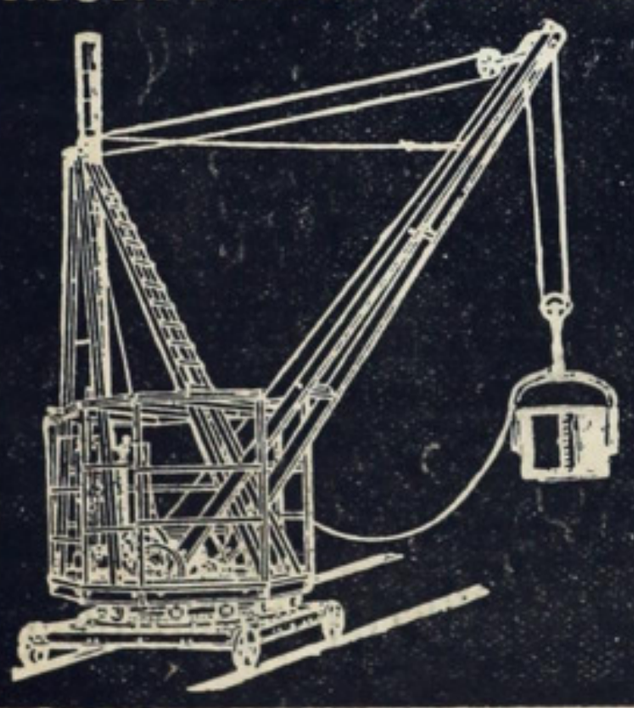
For further particulars, address

WILLIAM HALPIN,
Successor to KEEGAN & HALPIN,
45 and 46 Washington St., NEW YORK.

McMYLER MANUFACTURING CO., 180 COLUMBUS STREET, CLEVELAND, O.

SOLE MAKERS OF THE

McMYLER PATENT REVOLVING STEAM DERRICK

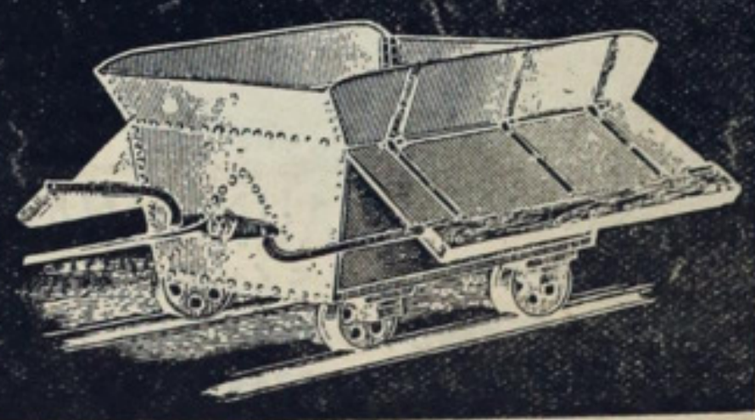


FOR HANDLING COAL, ORE AND COARSE FREIGHT OF ANY DESCRIPTION.

This Derrick can Lift Load, Alter the Radius of Boom, Swing in Either Direction at Will of Operator, and can Propel Itself on Track any Desired Distance.

BUILT FOR ANY CAPACITY WANTED

BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE BUCKETS AND DUMP CARS.



FRONTIER IRON WORKS

MARINE ENGINES,
DETROIT, MICH.

AMERICAN SHIP WINDLASS CO.

P. O. BOX 53, PROVIDENCE, R. I.

BUILDERS OF THE

"Providence" Windlasses and Capstans

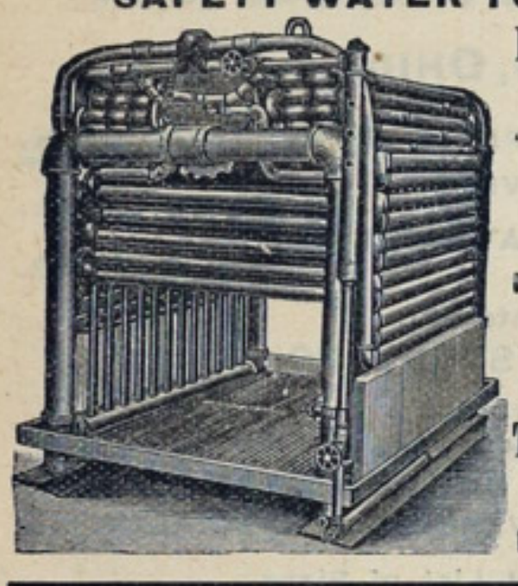
350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

THE ROBERTS

SAFETY WATER TUBE MARINE BOILER,



For Yachts, Launches and other Steamers.

THE ORIGINAL FIXED WATER LINE PIPE BOILER.

"Imitation the Sincerest Flattery." We are collecting royalties from the customers of many infringers.

OVER 500 IN USE.

☞ SAFE, RELIABLE, SIMPLE, LIGHT WEIGHT, ECONOMICAL, NO SHOP REPAIRS, SMALL SPACE. Send for Illustrated Pamphlet and other reading matter, with hundreds of enthusiastic letters from purchasers and engineers.

The Roberts Safety Water Tube Boiler Co.

Works covering 12,000 sq. ft. of ground at RED BANK, N. J.

18 Cortlandt Street, NEW YORK CITY.

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER ON SHORT NOTICE.

654 Seneca Street, Cleveland, Ohio.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, Paid up in Cash, - -	$3,000,000.00
ASSETS, . - - - - - - - - -	9,744,513.70

CHARLES PLATT, President. WILLIAM A. PLATT, Vice-President,
EUGENE L. ELLISON, 2nd Vice-President. GREVILLE E. FRYER, Sec'y. & Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department. GEORGE L. McCURDY, Manager.
CHICAGO, ILLS.

DAVID WHITNEY, JR., President. THE F. H. WHITNEY, Secretary

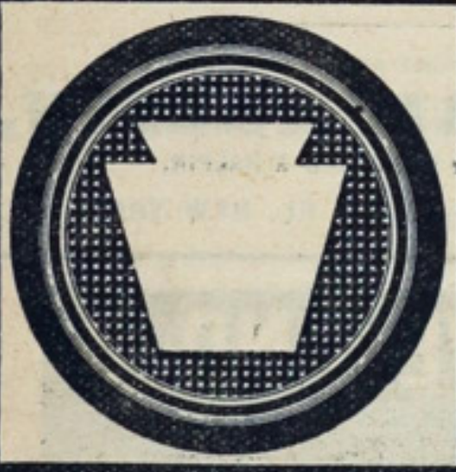
MICHIGAN

Fire and Marine Insurance Company,

DETROIT, MICH.

CASH CAPITAL, - - -	$ 400,000.00
CASH ASSETS, - - - -	840,000.00
LOSSES PAID, - - - -	1,800,000.00

THIS COMPANY DOES A GENERAL MARINE BUSINESS on the GREAT LAKES.
AGENTS AT ALL PRINCIPAL LAKE PORTS.



ERIE RUBBER CO.

ERIE. PA.
Manufacturers of the
KEYSTONE MARINE VALVE
THESE
RED RUBBER VALVES
ARE THE
BEST AIR & FOOT VALVES MADE.
IF YOUR DEALER DOES NOT KEEP THEM, WRITE DIRECT TO THE FACTORY.

ALMY'S PATENT SECTIONAL WATER TUBE BOILER.

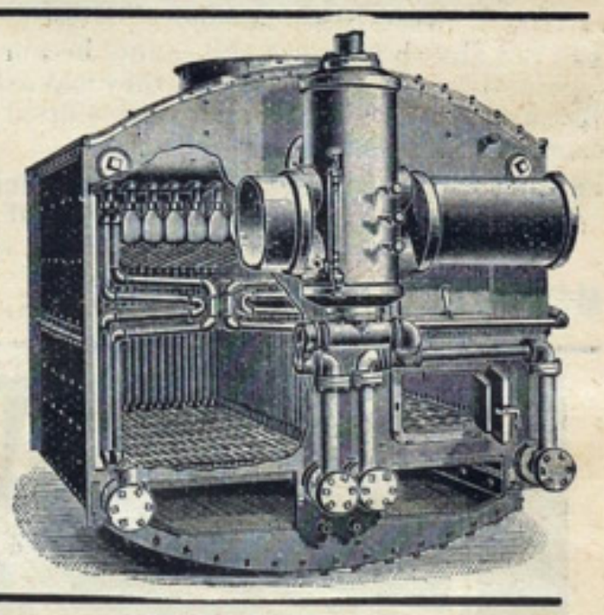
The Most Efficient and Reliable Water Tube Boiler on the Market.

is neither a copy nor an infringement of any other Boiler.

MANUFACTURED BY

The Almy Water Tube Boiler Co.

No. 47 CLIFFORD STREET,
PROVIDENCE. R. I.



WARD BOILERS FOR STEAMERS LARGE OR SMALL

LIGHT WEIGHT, GREAT POWER

THREE TYPES,

LAUNCH, NAVY AND MARINE.

ADOPTED BY U.S. GOVERNMENT. WAR VESSELS, LAUNCHES, REVENUE CUTTERS, TUGS.

AFTER THE MOST EXHAUSTIVE COMPETITIVE TESTS. Correspondence Invited.

CHARLES WARD,
CHARLESTON, KANAWHA CO., W. VA.

In Use on 800 Lake Steamers.

ON THE LAKES In Rough Weather You Want a

Perfectly Automatic Injector.

THE PENBERTHY

Is the only one which will give you satisfaction.

SEND FOR CATALOGUE.

PENBERTHY INJECTOR CO.

Detroit, Mich.